



Full wwPDB/EMDatabank EM Map/Model Validation Report ⓘ

Oct 1, 2019 – 04:53 PM EDT

PDB ID : 6PQX
EMDB ID: : EMD-20455
Title : Cryo-EM structure of HzTransib/nicked TIR substrate DNA hairpin forming complex (HFC)
Authors : Liu, C.; Yang, Y.; Schatz, D.G.
Deposited on : 2019-07-10
Resolution : 4.60 Å(reported)
Based on PDB ID : 6PQN

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) : 2.4

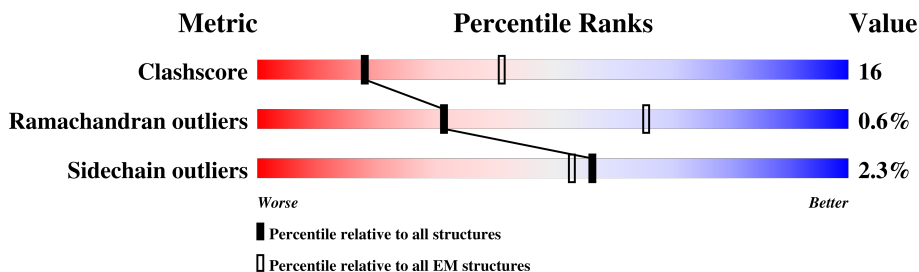
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.60 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	497	68%	27% . .
1	E	497	66%	29% . .
2	B	16	38%	50% 13%
2	F	16	38%	50% 13%
3	C	16	75%	25%
3	G	16	69%	31%
4	D	32	50%	44% 6%
4	H	32	47%	47% 6%

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 10116 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 DNA-mediated transposase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	480	Total	C	N	O	S	0	0
			3826	2433	654	721	18		
1	E	480	Total	C	N	O	S	0	0
			3826	2433	654	721	18		

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	508	HIS	-	expression tag	UNP B0F0C5
A	509	HIS	-	expression tag	UNP B0F0C5
A	510	HIS	-	expression tag	UNP B0F0C5
A	511	HIS	-	expression tag	UNP B0F0C5
A	512	HIS	-	expression tag	UNP B0F0C5
A	513	HIS	-	expression tag	UNP B0F0C5
E	508	HIS	-	expression tag	UNP B0F0C5
E	509	HIS	-	expression tag	UNP B0F0C5
E	510	HIS	-	expression tag	UNP B0F0C5
E	511	HIS	-	expression tag	UNP B0F0C5
E	512	HIS	-	expression tag	UNP B0F0C5
E	513	HIS	-	expression tag	UNP B0F0C5

- Molecule 2 is a DNA chain called DNA (5'-D(P*TP*CP*TP*GP*GP*CP*CP*TP*AP*GP*AP*TP*CP*T)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	B	14	Total	C	N	O	P	0	0
			284	136	47	87	14		
2	F	14	Total	C	N	O	P	0	0
			284	136	47	87	14		

- Molecule 3 is a DNA chain called DNA (5'-D(P*CP*AP*CP*GP*GP*TP*GP*GP*AP*TP*CP*GP*AP*AP*AP*A)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	16	Total	C	N	O	P	0	0
			333	157	68	92	16		
3	G	16	Total	C	N	O	P	0	0
			333	157	68	92	16		

- Molecule 4 is a DNA chain called TIR substrate DNA transferred strand.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	30	Total	C	N	O	P	0	0
			613	292	110	181	30		
4	H	30	Total	C	N	O	P	0	0
			613	292	110	181	30		

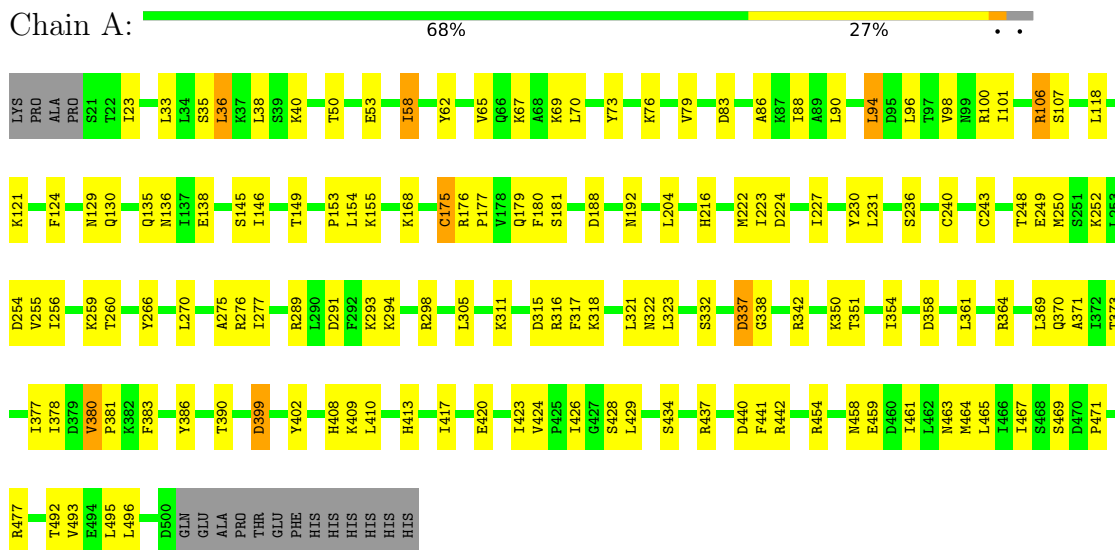
- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
5	A	2	Total	Ca	0
			2	2	
5	E	2	Total	Ca	0
			2	2	

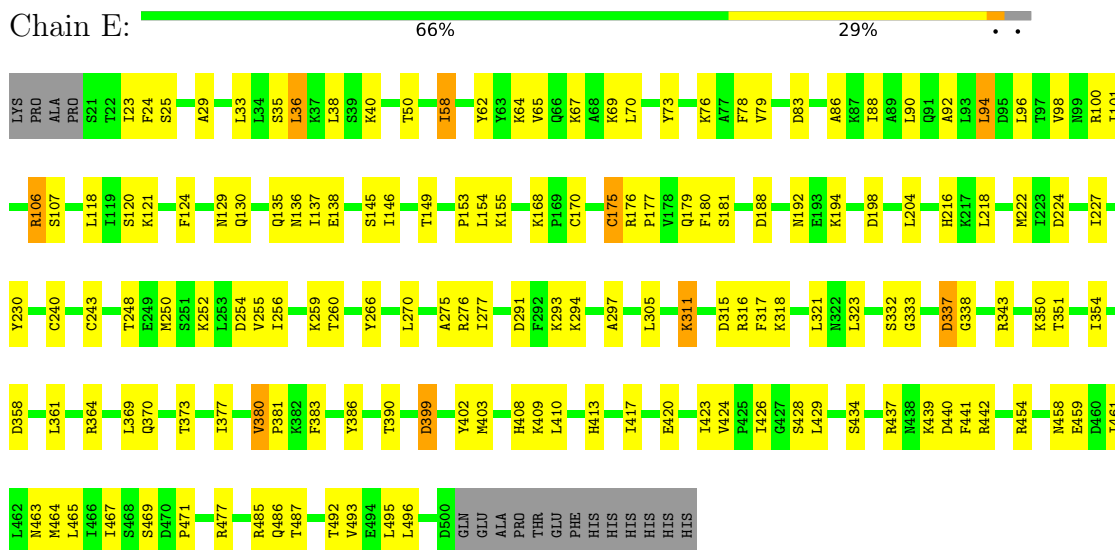
3 Residue-property plots

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.

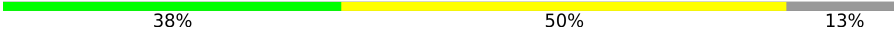
- Molecule 1: DNA-mediated transposase

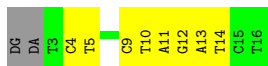


- Molecule 1: DNA-mediated transposase



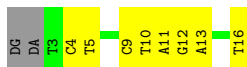
- Molecule 2: DNA (5'-D(P*TP*CP*TP*GP*GP*CP*CP*TP*AP*GP*AP*TP*CP*T)-3')

Chain B:  38% 50% 13%



- Molecule 2: DNA (5'-D(P*TP*CP*TP*GP*GP*CP*CP*TP*AP*GP*AP*TP*CP*T)-3')

Chain F:  38% 50% 13%



- Molecule 3: DNA (5'-D(P*CP*AP*CP*GP*GP*TP*GP*GP*AP*TP*CP*GP*AP*AP*AP*A)-3')

Chain C:  75% 25%



- Molecule 3: DNA (5'-D(P*CP*AP*CP*GP*GP*TP*GP*GP*AP*TP*CP*GP*AP*AP*AP*A)-3')

Chain G:  69% 31%



- Molecule 4: TIR substrate DNA transferred strand

Chain D:  50% 44% 6%



- Molecule 4: TIR substrate DNA transferred strand

Chain H:  47% 47% 6%



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	3997	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 ($e^-/\text{\AA}^2$)	52.2	Depositor
Minimum defocus (nm)	1400	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	130000	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: 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 >2	RMSZ	# Z >2
1	A	0.32	0/3899	0.54	0/5261
1	E	0.32	0/3899	0.54	0/5261
2	B	0.71	0/316	1.09	0/485
2	F	0.71	0/316	1.09	0/485
3	C	0.84	0/375	1.00	0/577
3	G	0.84	0/375	1.01	0/577
4	D	0.79	0/686	1.09	0/1056
4	H	0.80	0/686	1.09	0/1056
All	All	0.49	0/10552	0.73	0/14758

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	3826	0	3880	130	0
1	E	3826	0	3880	139	0
2	B	284	0	160	12	0
2	F	284	0	160	9	0
3	C	333	0	179	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	G	333	0	179	10	0
4	D	613	0	339	15	0
4	H	613	0	339	12	0
5	A	2	0	0	0	0
5	E	2	0	0	0	0
All	All	10116	0	9116	300	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 16.

All (300) 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:A:243:CYS:SG	1:A:413:HIS:CE1	2.43	1.11
1:A:243:CYS:HG	1:A:413:HIS:CE1	1.68	1.11
1:E:243:CYS:SG	1:E:413:HIS:CE1	2.43	1.10
1:E:243:CYS:HG	1:E:413:HIS:CE1	1.69	1.10
1:A:243:CYS:SG	1:A:408:HIS:NE2	2.26	1.08
1:E:243:CYS:SG	1:E:408:HIS:NE2	2.26	1.07
1:E:408:HIS:NE2	1:E:413:HIS:HE1	1.59	0.99
1:A:408:HIS:NE2	1:A:413:HIS:HE1	1.59	0.99
1:E:243:CYS:SG	1:E:413:HIS:HE1	2.04	0.79
1:A:351:THR:HA	1:A:354:ILE:HG22	1.65	0.79
1:A:243:CYS:SG	1:A:413:HIS:HE1	2.04	0.79
1:E:351:THR:HA	1:E:354:ILE:HG22	1.65	0.77
1:A:121:LYS:HG2	1:A:154:LEU:HD11	1.65	0.77
1:E:121:LYS:HG2	1:E:154:LEU:HD11	1.65	0.77
2:F:11:DA:H2''	2:F:12:DG:C8	2.20	0.77
2:B:11:DA:H2''	2:B:12:DG:C8	2.20	0.77
1:E:316:ARG:HB3	1:E:354:ILE:HD11	1.66	0.76
1:A:316:ARG:HB3	1:A:354:ILE:HD11	1.66	0.76
1:A:243:CYS:SG	1:A:413:HIS:NE2	2.53	0.75
1:E:243:CYS:SG	1:E:413:HIS:NE2	2.53	0.70
2:F:12:DG:H22	4:H:21:DC:H42	1.38	0.69
1:E:408:HIS:NE2	1:E:413:HIS:CE1	2.52	0.69
1:E:297:ALA:HB3	2:F:13:DA:H5''	1.75	0.69
1:A:342:ARG:NE	3:C:18:DA:OP1	2.24	0.69
1:A:90:LEU:O	1:A:94:LEU:HD23	1.92	0.69
1:E:90:LEU:O	1:E:94:LEU:HD23	1.92	0.68
1:A:342:ARG:HH11	3:C:18:DA:H5'	1.59	0.68
1:E:243:CYS:SG	1:E:408:HIS:CD2	2.86	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:243:CYS:SG	1:A:408:HIS:CD2	2.86	0.67
2:B:12:DG:H1	4:D:21:DC:N4	1.93	0.67
1:A:408:HIS:HE2	1:A:413:HIS:HE1	1.42	0.66
1:A:408:HIS:NE2	1:A:413:HIS:CE1	2.52	0.66
1:E:188:ASP:O	1:E:192:ASN:ND2	2.26	0.66
1:E:270:LEU:HB3	1:E:426:ILE:HD11	1.79	0.65
1:A:270:LEU:HB3	1:A:426:ILE:HD11	1.79	0.64
1:A:188:ASP:O	1:A:192:ASN:ND2	2.26	0.63
1:E:408:HIS:HE2	1:E:413:HIS:HE1	1.42	0.63
2:B:12:DG:H1	4:D:21:DC:H42	1.46	0.63
1:E:485:ARG:NH1	3:G:17:DC:OP1	2.24	0.63
1:A:289:ARG:NH2	2:B:14:DT:OP1	2.32	0.62
2:B:10:DT:O2	4:D:24:DG:N2	2.32	0.62
1:A:106:ARG:NH1	1:A:107:SER:O	2.33	0.61
1:E:106:ARG:NH1	1:E:107:SER:O	2.33	0.61
1:E:179:GLN:NE2	1:E:181:SER:OG	2.34	0.60
1:A:179:GLN:NE2	1:A:181:SER:OG	2.34	0.60
1:A:248:THR:O	1:A:252:LYS:NZ	2.35	0.60
1:A:83:ASP:HB3	1:A:136:ASN:HD21	1.67	0.60
1:A:377:ILE:H	1:A:377:ILE:HD12	1.68	0.59
1:A:492:THR:O	1:A:496:LEU:N	2.34	0.59
1:E:176:ARG:HH12	1:E:471:PRO:HD3	1.68	0.59
1:E:377:ILE:HD12	1:E:377:ILE:H	1.68	0.59
1:E:437:ARG:HH12	1:E:469:SER:HB2	1.68	0.59
1:A:437:ARG:HH12	1:A:469:SER:HB2	1.68	0.58
1:E:83:ASP:HB3	1:E:136:ASN:HD21	1.67	0.58
1:E:248:THR:O	1:E:252:LYS:NZ	2.35	0.58
1:A:176:ARG:HH12	1:A:471:PRO:HD3	1.68	0.58
1:A:266:TYR:CD1	1:A:417:ILE:HG22	2.39	0.57
1:A:177:PRO:HD3	1:A:465:LEU:HG	1.87	0.57
1:A:86:ALA:O	1:A:179:GLN:HG2	2.05	0.57
4:D:28:DA:H1'	4:D:29:DG:H5'	1.86	0.57
4:D:4:DT:OP1	1:E:64:LYS:NZ	2.37	0.57
1:E:266:TYR:CD1	1:E:417:ILE:HG22	2.39	0.57
1:E:79:VAL:HA	1:E:88:ILE:HG22	1.86	0.57
4:H:28:DA:H1'	4:H:29:DG:H5'	1.87	0.56
1:A:79:VAL:HA	1:A:88:ILE:HG22	1.86	0.56
3:C:20:DG:C2	4:D:14:DG:N2	2.73	0.56
1:E:177:PRO:HD3	1:E:465:LEU:HG	1.87	0.56
1:E:277:ILE:HD11	1:E:337:ASP:HA	1.87	0.56
1:E:86:ALA:O	1:E:179:GLN:HG2	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:277:ILE:HD11	1:A:337:ASP:HA	1.87	0.56
1:A:176:ARG:NH1	1:A:471:PRO:HD3	2.21	0.56
1:E:486:GLN:HB3	3:G:17:DC:C4	2.41	0.56
1:E:129:ASN:HB3	1:E:442:ARG:HH22	1.72	0.55
1:A:276:ARG:HE	1:A:369:LEU:HD22	1.72	0.55
1:A:291:ASP:OD2	1:A:305:LEU:HB3	2.07	0.55
1:A:36:LEU:HD12	1:E:38:LEU:HD22	1.89	0.55
1:E:176:ARG:NH1	1:E:471:PRO:HD3	2.21	0.55
1:E:291:ASP:OD2	1:E:305:LEU:HB3	2.07	0.55
4:H:22:DT:H2''	4:H:23:DA:N7	2.22	0.55
1:A:175:CYS:O	1:A:437:ARG:NH1	2.30	0.55
4:D:22:DT:H2''	4:D:23:DA:N7	2.22	0.55
1:E:486:GLN:HB3	3:G:17:DC:C5	2.42	0.54
1:E:492:THR:O	1:E:496:LEU:N	2.33	0.54
2:F:10:DT:H2''	2:F:11:DA:N7	2.22	0.54
1:E:270:LEU:HA	1:E:409:LYS:NZ	2.23	0.54
1:A:98:VAL:HA	1:A:101:ILE:HD12	1.89	0.54
1:E:98:VAL:HA	1:E:101:ILE:HD12	1.89	0.54
1:A:129:ASN:HB3	1:A:442:ARG:HH22	1.72	0.54
2:B:10:DT:H2''	2:B:11:DA:N7	2.22	0.54
4:D:9:DC:H2''	4:D:10:DC:C6	2.43	0.53
1:A:270:LEU:HA	1:A:409:LYS:NZ	2.23	0.53
1:E:276:ARG:HE	1:E:369:LEU:HD22	1.72	0.53
4:H:9:DC:H2''	4:H:10:DC:C6	2.43	0.53
1:A:337:ASP:OD1	1:A:338:GLY:N	2.42	0.53
1:E:337:ASP:OD1	1:E:338:GLY:N	2.42	0.53
1:A:298:ARG:HG3	2:B:13:DA:H5'	1.91	0.53
1:E:175:CYS:O	1:E:437:ARG:NH1	2.30	0.53
1:E:118:LEU:HD21	1:E:153:PRO:HB3	1.92	0.52
1:A:259:LYS:NZ	1:A:260:THR:OG1	2.41	0.52
1:E:106:ARG:NH1	1:E:107:SER:OG	2.42	0.52
1:E:315:ASP:O	1:E:318:LYS:HG2	2.10	0.52
1:A:315:ASP:O	1:A:318:LYS:HG2	2.10	0.51
1:A:130:GLN:HE22	1:A:442:ARG:HG2	1.76	0.51
1:A:364:ARG:NE	1:A:390:THR:OG1	2.32	0.51
1:A:118:LEU:HD21	1:A:153:PRO:HB3	1.91	0.51
1:A:106:ARG:NH1	1:A:107:SER:OG	2.42	0.51
2:B:12:DG:H22	4:D:21:DC:H42	1.58	0.51
1:A:275:ALA:HB1	1:A:410:LEU:HD11	1.92	0.51
1:E:364:ARG:NH2	1:E:386:TYR:O	2.38	0.51
1:E:275:ALA:HB1	1:E:410:LEU:HD11	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:130:GLN:NE2	1:A:146:ILE:HD11	2.26	0.50
1:E:94:LEU:O	1:E:98:VAL:HG22	2.12	0.50
1:A:224:ASP:N	1:A:224:ASP:OD1	2.44	0.50
1:E:130:GLN:HE22	1:E:442:ARG:HG2	1.76	0.50
4:D:19:DA:H2''	4:D:20:DT:H5'	1.93	0.50
1:A:493:VAL:HA	1:A:496:LEU:HB2	1.94	0.50
1:E:130:GLN:NE2	1:E:146:ILE:HD11	2.26	0.49
1:A:67:LYS:HA	1:A:70:LEU:HD12	1.95	0.49
1:A:240:CYS:SG	1:A:243:CYS:SG	3.09	0.49
1:E:364:ARG:NE	1:E:390:THR:OG1	2.32	0.49
4:H:19:DA:H2''	4:H:20:DT:H5'	1.95	0.49
1:A:317:PHE:CD2	1:A:323:LEU:HD21	2.47	0.49
1:E:317:PHE:CD2	1:E:323:LEU:HD21	2.47	0.49
1:A:364:ARG:NH2	1:A:386:TYR:O	2.38	0.49
1:A:249:GLU:HA	1:A:252:LYS:HZ1	1.78	0.49
1:A:94:LEU:O	1:A:98:VAL:HG22	2.12	0.49
1:A:358:ASP:OD2	1:A:361:LEU:N	2.38	0.49
1:E:67:LYS:HA	1:E:70:LEU:HD12	1.95	0.49
1:E:437:ARG:NH1	1:E:469:SER:HB2	2.28	0.48
1:A:318:LYS:HG3	1:E:137:ILE:HD13	1.94	0.48
2:F:10:DT:H2''	2:F:11:DA:C8	2.48	0.48
1:E:493:VAL:HA	1:E:496:LEU:HB2	1.94	0.48
3:G:18:DA:C8	3:G:18:DA:H5'	2.49	0.48
3:C:18:DA:H5'	3:C:18:DA:C8	2.49	0.48
1:E:240:CYS:SG	1:E:243:CYS:SG	3.09	0.48
2:B:10:DT:H2''	2:B:11:DA:C8	2.48	0.48
1:E:259:LYS:NZ	1:E:260:THR:OG1	2.41	0.48
1:A:121:LYS:CG	1:A:154:LEU:HD11	2.40	0.48
1:A:250:MET:HA	1:A:256:ILE:HD11	1.96	0.48
1:A:270:LEU:HD13	1:A:417:ILE:HD11	1.95	0.48
1:E:50:THR:HG21	1:E:58:ILE:HG12	1.96	0.48
1:A:130:GLN:HE21	1:A:146:ILE:HD11	1.80	0.47
1:A:399:ASP:N	1:A:399:ASP:OD1	2.41	0.47
2:B:12:DG:C2	2:B:13:DA:C6	3.03	0.47
1:A:291:ASP:OD1	1:A:291:ASP:N	2.46	0.47
1:E:23:ILE:HD12	1:E:58:ILE:HA	1.97	0.47
1:E:270:LEU:HD13	1:E:417:ILE:HD11	1.95	0.47
1:E:88:ILE:HD11	1:E:177:PRO:O	2.15	0.47
1:A:76:LYS:HA	1:A:79:VAL:HG22	1.96	0.47
4:D:6:DG:C6	4:D:7:DA:C6	3.03	0.47
1:E:291:ASP:N	1:E:291:ASP:OD1	2.46	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:408:HIS:HE2	1:A:413:HIS:CE1	2.27	0.47
4:H:12:DC:H2'	4:H:13:DC:C5	2.50	0.47
2:F:12:DG:C2	2:F:13:DA:C6	3.03	0.46
1:E:439:LYS:HB2	4:H:15:DT:H1'	1.96	0.46
1:A:255:VAL:HG13	1:A:256:ILE:HG13	1.97	0.46
1:E:250:MET:HA	1:E:256:ILE:HD11	1.96	0.46
1:A:276:ARG:NH2	3:C:18:DA:OP2	2.48	0.46
1:A:50:THR:HG21	1:A:58:ILE:HG12	1.96	0.46
1:A:437:ARG:NH1	1:A:469:SER:HB2	2.28	0.46
1:E:248:THR:HG22	1:E:402:TYR:CZ	2.51	0.46
1:A:408:HIS:CD2	1:A:413:HIS:HE1	2.31	0.46
1:A:88:ILE:HD11	1:A:177:PRO:O	2.15	0.46
1:A:23:ILE:HD12	1:A:58:ILE:HA	1.97	0.46
1:E:222:MET:HE2	1:E:434:SER:HB2	1.98	0.46
1:E:255:VAL:HG13	1:E:256:ILE:HG13	1.97	0.46
1:E:76:LYS:HA	1:E:79:VAL:HG22	1.97	0.46
1:E:121:LYS:CG	1:E:154:LEU:HD11	2.40	0.46
1:E:485:ARG:HD3	3:G:17:DC:OP1	2.16	0.46
1:A:236:SER:HB2	4:D:21:DC:H4'	1.97	0.45
4:D:4:DT:OP2	1:E:67:LYS:NZ	2.40	0.45
1:E:130:GLN:HE21	1:E:146:ILE:HD11	1.80	0.45
1:E:154:LEU:HD22	1:E:424:VAL:HG11	1.98	0.45
1:A:222:MET:HE2	1:A:434:SER:HB2	1.98	0.45
1:A:322:ASN:HA	1:E:137:ILE:HG23	1.97	0.45
1:A:53:GLU:HG3	1:E:24:PHE:CZ	2.51	0.45
1:E:333:GLY:N	2:F:16:DT:O4	2.50	0.45
1:A:154:LEU:HD22	1:A:424:VAL:HG11	1.98	0.45
1:A:358:ASP:HB3	1:A:361:LEU:HD23	1.99	0.45
4:H:6:DG:C6	4:H:7:DA:C6	3.03	0.45
1:A:248:THR:HG22	1:A:402:TYR:CZ	2.51	0.45
1:A:129:ASN:O	1:A:442:ARG:NH2	2.50	0.45
1:A:227:ILE:HD13	1:A:230:TYR:HE2	1.82	0.45
1:E:358:ASP:OD2	1:E:361:LEU:N	2.38	0.45
1:E:177:PRO:HB3	1:E:465:LEU:HD23	1.99	0.45
3:C:28:DG:H2''	3:C:29:DA:C8	2.52	0.45
1:E:399:ASP:N	1:E:399:ASP:OD1	2.41	0.45
3:G:28:DG:H2''	3:G:29:DA:C8	2.52	0.45
1:E:129:ASN:O	1:E:442:ARG:NH2	2.50	0.44
1:A:177:PRO:HB3	1:A:465:LEU:HD23	1.99	0.44
1:E:121:LYS:NZ	1:E:428:SER:O	2.43	0.44
1:E:121:LYS:HD3	1:E:429:LEU:HA	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:194:LYS:NZ	1:E:198:ASP:OD2	2.38	0.44
1:A:121:LYS:HD3	1:A:429:LEU:HA	2.00	0.44
2:B:4:DC:H2''	2:B:5:DT:H71	2.00	0.44
1:E:96:LEU:O	1:E:100:ARG:HG2	2.17	0.44
1:E:118:LEU:HD12	1:E:155:LYS:O	2.18	0.44
1:A:136:ASN:HD22	1:A:454:ARG:HD2	1.82	0.44
1:A:118:LEU:HD12	1:A:155:LYS:O	2.18	0.44
1:A:266:TYR:HB3	1:A:420:GLU:HG2	2.00	0.44
1:A:270:LEU:HA	1:A:409:LYS:HZ1	1.82	0.44
1:A:321:LEU:HD13	1:A:321:LEU:HA	1.90	0.44
1:E:227:ILE:HD13	1:E:230:TYR:HE2	1.82	0.44
1:E:343:ARG:NH2	4:H:12:DC:OP1	2.50	0.43
1:E:86:ALA:HB3	1:E:180:PHE:CE1	2.53	0.43
1:A:136:ASN:C	1:A:138:GLU:H	2.21	0.43
1:A:96:LEU:O	1:A:100:ARG:HG2	2.18	0.43
1:E:266:TYR:CB	1:E:420:GLU:HG2	2.49	0.43
1:E:358:ASP:HB3	1:E:361:LEU:HD23	1.99	0.43
1:A:38:LEU:HD22	1:E:36:LEU:HD12	2.00	0.43
1:E:136:ASN:HD22	1:E:454:ARG:HD2	1.82	0.43
1:E:380:VAL:N	1:E:381:PRO:HD2	2.34	0.43
1:A:35:SER:HA	1:A:477:ARG:NH2	2.34	0.43
1:A:364:ARG:HG2	1:A:386:TYR:OH	2.19	0.43
1:A:135:GLN:O	1:A:454:ARG:NH1	2.52	0.43
1:A:383:PHE:CD2	1:A:495:LEU:HD21	2.54	0.43
1:E:25:SER:O	1:E:29:ALA:N	2.47	0.43
1:E:439:LYS:HD2	4:H:15:DT:O2	2.18	0.43
1:E:458:ASN:HA	1:E:461:ILE:HG22	2.01	0.43
1:E:35:SER:HA	1:E:477:ARG:NH2	2.34	0.43
1:A:86:ALA:HB3	1:A:180:PHE:CE1	2.53	0.42
1:A:266:TYR:CB	1:A:420:GLU:HG2	2.49	0.42
1:A:458:ASN:HA	1:A:461:ILE:HG22	2.01	0.42
1:A:459:GLU:OE1	1:A:463:ASN:ND2	2.51	0.42
1:E:266:TYR:HB3	1:E:420:GLU:HG2	2.00	0.42
2:F:4:DC:H2''	2:F:5:DT:H71	2.00	0.42
1:A:321:LEU:HD21	1:A:350:LYS:HB3	2.02	0.42
4:D:6:DG:H2''	4:D:7:DA:H8	1.84	0.42
1:E:293:LYS:O	1:E:294:LYS:HD2	2.19	0.42
1:E:317:PHE:CE2	1:E:323:LEU:HD11	2.55	0.42
1:E:270:LEU:HA	1:E:409:LYS:HZ1	1.82	0.42
1:E:487:THR:O	3:G:17:DC:N4	2.51	0.42
1:A:118:LEU:HB3	1:A:216:HIS:HD1	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:380:VAL:N	1:A:381:PRO:HD2	2.34	0.42
1:A:40:LYS:HG3	1:A:62:TYR:CZ	2.54	0.42
1:E:136:ASN:C	1:E:138:GLU:H	2.21	0.42
1:E:321:LEU:HD21	1:E:350:LYS:HB3	2.01	0.42
1:A:129:ASN:HB3	1:A:442:ARG:NH2	2.34	0.42
1:A:317:PHE:CE2	1:A:323:LEU:HD11	2.55	0.42
1:E:40:LYS:HG3	1:E:62:TYR:CZ	2.54	0.42
2:F:9:DC:H2''	2:F:10:DT:C6	2.55	0.42
1:A:40:LYS:HD3	3:G:23:DG:C8	2.55	0.42
1:E:383:PHE:CD2	1:E:495:LEU:HD21	2.54	0.42
1:A:223:ILE:HA	1:A:223:ILE:HD12	1.93	0.42
1:A:293:LYS:O	1:A:294:LYS:HD2	2.19	0.42
1:A:370:GLN:HA	1:A:373:THR:HG22	2.02	0.42
1:E:364:ARG:HG2	1:E:386:TYR:OH	2.19	0.42
2:B:9:DC:H2''	2:B:10:DT:C6	2.55	0.42
1:E:370:GLN:HA	1:E:373:THR:HG22	2.02	0.42
1:E:408:HIS:CD2	1:E:413:HIS:CE1	3.08	0.42
1:A:136:ASN:HB3	1:A:454:ARG:NE	2.34	0.42
1:A:40:LYS:HG3	1:A:62:TYR:CE1	2.55	0.42
1:E:170:CYS:HB3	3:G:18:DA:H4'	2.02	0.42
1:E:337:ASP:HB2	4:H:16:DG:C6	2.55	0.42
1:A:240:CYS:HB3	1:A:243:CYS:HB2	2.02	0.42
1:A:423:ILE:HG23	1:A:424:VAL:HG23	2.02	0.42
1:A:69:LYS:HB3	1:A:73:TYR:CZ	2.55	0.42
1:E:135:GLN:O	1:E:454:ARG:NH1	2.52	0.42
1:E:69:LYS:HB3	1:E:73:TYR:CZ	2.55	0.42
1:A:33:LEU:HD12	1:A:38:LEU:HB2	2.02	0.41
1:A:121:LYS:NZ	1:A:428:SER:O	2.43	0.41
1:E:168:LYS:HA	1:E:168:LYS:HE2	2.02	0.41
1:E:256:ILE:HD13	1:E:408:HIS:CE1	2.55	0.41
1:E:423:ILE:HG23	1:E:424:VAL:HG23	2.02	0.41
1:E:136:ASN:HB3	1:E:454:ARG:NE	2.34	0.41
1:E:40:LYS:HG3	1:E:62:TYR:CE1	2.55	0.41
1:E:254:ASP:OD1	1:E:254:ASP:N	2.53	0.41
4:H:6:DG:H2''	4:H:7:DA:H8	1.84	0.41
1:E:227:ILE:HA	1:E:230:TYR:CD2	2.56	0.41
1:A:168:LYS:HA	1:A:168:LYS:HE2	2.02	0.41
1:E:464:MET:HA	1:E:467:ILE:HG22	2.03	0.41
1:E:492:THR:O	1:E:496:LEU:HG	2.20	0.41
1:A:227:ILE:HA	1:A:230:TYR:CD2	2.56	0.41
1:E:224:ASP:N	1:E:224:ASP:OD1	2.44	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:440:ASP:OD2	1:A:440:ASP:N	2.54	0.41
1:A:464:MET:HA	1:A:467:ILE:HG22	2.03	0.41
1:E:170:CYS:HB2	3:G:18:DA:O3'	2.21	0.41
1:E:240:CYS:HB3	1:E:243:CYS:HB2	2.02	0.41
1:E:33:LEU:HD12	1:E:38:LEU:HB2	2.02	0.41
1:E:440:ASP:OD2	1:E:440:ASP:N	2.54	0.41
1:E:441:PHE:CE1	1:E:461:ILE:HG12	2.56	0.41
1:E:118:LEU:HB3	1:E:216:HIS:HD1	1.84	0.41
1:A:492:THR:O	1:A:496:LEU:HG	2.20	0.41
1:A:227:ILE:HG22	1:A:231:LEU:HD13	2.03	0.41
1:A:254:ASP:OD1	1:A:254:ASP:N	2.53	0.41
1:A:441:PHE:CE1	1:A:461:ILE:HG12	2.56	0.41
4:D:22:DT:C2	4:D:23:DA:C6	3.09	0.41
1:E:408:HIS:CD2	1:E:413:HIS:HE1	2.31	0.41
1:A:256:ILE:HD13	1:A:408:HIS:CE1	2.55	0.40
1:E:248:THR:HA	1:E:402:TYR:CE1	2.56	0.40
1:E:403:MET:HE3	1:E:403:MET:H	1.85	0.40
1:A:124:PHE:HB3	1:A:149:THR:HA	2.04	0.40
1:E:120:SER:HB2	1:E:218:LEU:CD2	2.52	0.40
1:E:124:PHE:HB3	1:E:149:THR:HA	2.04	0.40
1:E:459:GLU:OE1	1:E:463:ASN:ND2	2.51	0.40
1:E:78:PHE:CG	1:E:92:ALA:HB2	2.57	0.40
1:A:227:ILE:HD13	1:A:230:TYR:CE2	2.56	0.40
1:A:371:ALA:O	1:A:378:ILE:HD11	2.22	0.40
1:E:311:LYS:HE3	1:E:311:LYS:HB3	1.94	0.40
1:E:36:LEU:HB3	1:E:38:LEU:HD21	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	A	478/497 (96%)	450 (94%)	25 (5%)	3 (1%)	27	69
1	E	478/497 (96%)	450 (94%)	25 (5%)	3 (1%)	27	69
All	All	956/994 (96%)	900 (94%)	50 (5%)	6 (1%)	31	69

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	337	ASP
1	E	337	ASP
1	A	332	SER
1	E	332	SER
1	E	58	ILE
1	A	58	ILE

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	426/442 (96%)	416 (98%)	10 (2%)	53	76
1	E	426/442 (96%)	416 (98%)	10 (2%)	53	76
All	All	852/884 (96%)	832 (98%)	20 (2%)	57	76

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	LEU
1	A	65	VAL
1	A	94	LEU
1	A	106	ARG
1	A	145	SER
1	A	175	CYS
1	A	204	LEU
1	A	311	LYS
1	A	380	VAL
1	A	399	ASP

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Mol	Chain	Res	Type
1	E	36	LEU
1	E	65	VAL
1	E	94	LEU
1	E	106	ARG
1	E	145	SER
1	E	175	CYS
1	E	204	LEU
1	E	311	LYS
1	E	380	VAL
1	E	399	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	136	ASN
1	A	179	GLN
1	A	322	ASN
1	A	413	HIS
1	E	136	ASN
1	E	179	GLN
1	E	413	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](#)

Of 4 ligands modelled in this entry, 4 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.