Full wwPDB X-ray Structure Validation Report (i)

Feb 1, 2016 – 11:55 AM GMT

PDB ID	:	3Q8M
Title	:	Crystal Structure of Human Flap Endonuclease FEN1 (D181A) in complex with substrate 5'-flap DNA and K+
Authors	:	Tsutakawa, S.E.; Classen, S.; Chapados, B.R.; Arvai, A.; Finger, D.L.; Guenther, G.; Tomlinson, C.G.; Thompson, P.; Sarker, A.H.; Shen, B.; Cooper, P.K.; Grasby, J.A.; Tainer, J.A.
Deposited on	:	2011-01-06
Resolution	:	2.60 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at
http://wwpdb.org/validation/2016/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

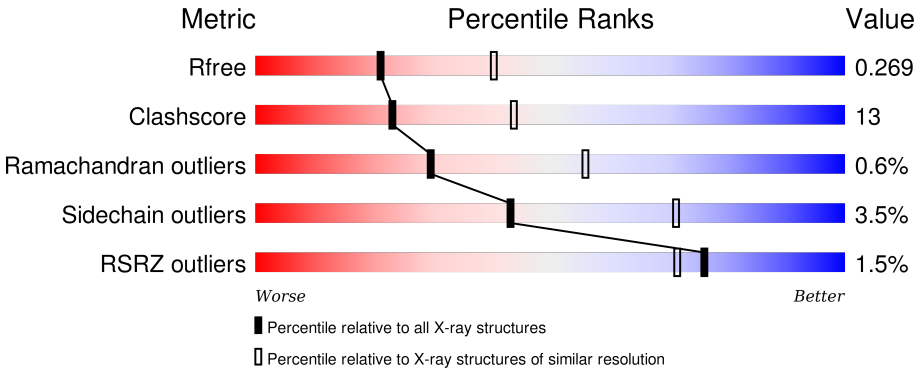
MolProbity	:	4.02b-467
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20026688
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	trunk26865

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	91344	2328 (2.60-2.60)
Clashscore	102246	2679 (2.60-2.60)
Ramachandran outliers	100387	2635 (2.60-2.60)
Sidechain outliers	100360	2635 (2.60-2.60)
RSRZ outliers	91569	2334 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower 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 <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	341	2% 74% 23%
1	B	341	3% 73% 24%
2	D	18	33% 56% 11%
2	G	18	39% 61%
3	E	12	25% 67% 8%

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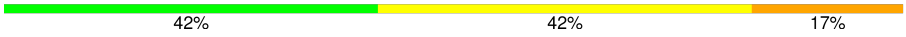
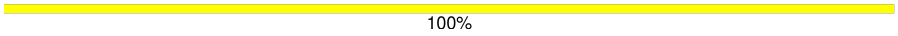
Mol	Chain	Length	Quality of chain
3	H	12	
4	F	7	
4	I	7	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 6859 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Flap endonuclease 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	335	Total	C	N	O	S	0	0	0
			2627	1655	458	499	15			
1	B	334	Total	C	N	O	S	0	0	0
			2624	1653	458	498	15			

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	181	ALA	ASP	ENGINEERED MUTATION	UNP P39748
A	337	LEU	-	EXPRESSION TAG	UNP P39748
A	338	GLU	-	EXPRESSION TAG	UNP P39748
A	339	VAL	-	EXPRESSION TAG	UNP P39748
A	340	LEU	-	EXPRESSION TAG	UNP P39748
A	341	PHE	-	EXPRESSION TAG	UNP P39748
A	342	GLN	-	EXPRESSION TAG	UNP P39748
B	181	ALA	ASP	ENGINEERED MUTATION	UNP P39748
B	337	LEU	-	EXPRESSION TAG	UNP P39748
B	338	GLU	-	EXPRESSION TAG	UNP P39748
B	339	VAL	-	EXPRESSION TAG	UNP P39748
B	340	LEU	-	EXPRESSION TAG	UNP P39748
B	341	PHE	-	EXPRESSION TAG	UNP P39748
B	342	GLN	-	EXPRESSION TAG	UNP P39748

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	18	Total	C	N	O	P	0	0	0
			363	174	66	106	17			
2	G	18	Total	C	N	O	P	0	0	0
			363	174	66	106	17			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	18	DT	-	EXPRESSION TAG	PDB 3Q8M
G	18	DT	-	EXPRESSION TAG	PDB 3Q8M

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	12	Total	C	N	O	P	0	0	0
			249	119	49	70	11			
3	H	12	Total	C	N	O	P	0	0	0
			249	119	49	70	11			

- Molecule 4 is a DNA chain called DNA (5'-D(*AP*CP*CP*GP*TP*CP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	7	Total	C	N	O	P	0	0	0
			136	66	24	40	6			
4	I	7	Total	C	N	O	P	0	0	0
			136	66	24	40	6			

- Molecule 5 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	1	Total	K	0	0
			1	1		
5	A	1	Total	K	0	0
			1	1		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	37	Total	O	0	0
			37	37		
6	B	55	Total	O	0	0
			55	55		
6	D	8	Total	O	0	0
			8	8		
6	E	5	Total	O	0	0
			5	5		
6	F	1	Total	O	0	0
			1	1		

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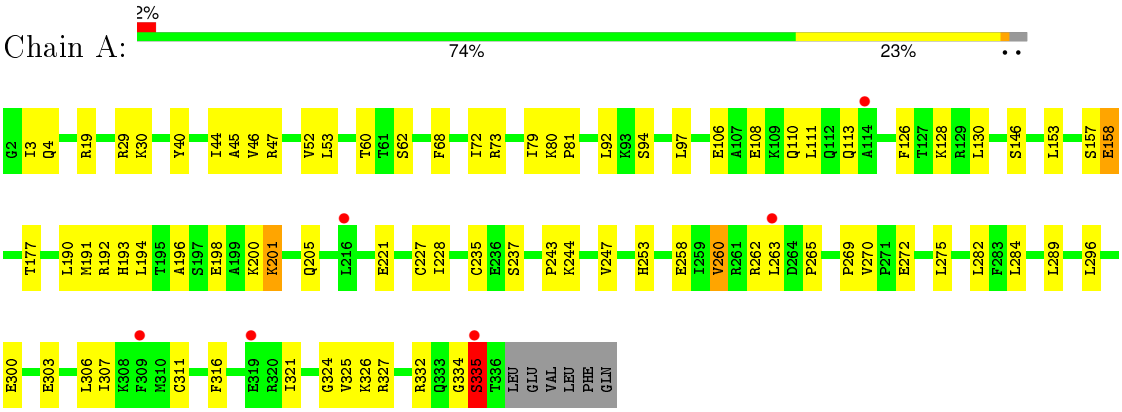
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	G	2	Total O 2 2	0	0
6	H	2	Total O 2 2	0	0

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 errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

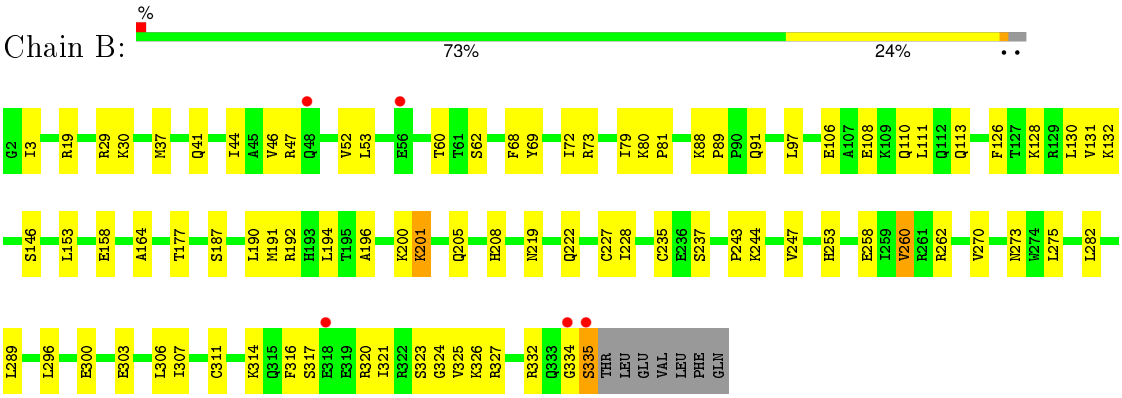
• Molecule 1: Flap endonuclease 1

Chain A:



• Molecule 1: Flap endonuclease 1

Chain B:



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

Chain D:

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

Chain G:

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

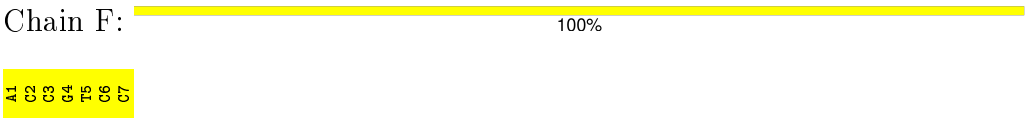
Chain E:

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

Chain H:

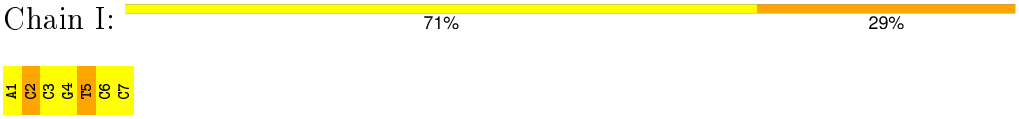
• Molecule 4: DNA (5'-D(*AP*CP*CP*GP*TP*CP*C)-3')

Chain F:



• Molecule 4: DNA (5'-D(*AP*CP*CP*GP*TP*CP*C)-3')

Chain I:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	59.52Å 94.94Å 104.52Å 90.00° 105.06° 90.00°	Depositor
Resolution (Å)	100.93 – 2.60 100.93 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.3 (100.93-2.60) 99.7 (100.93-2.60)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	0.05	Depositor
$< I/\sigma(I) >$ [1]	2.11 (at 2.62Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.217 , 0.272 0.209 , 0.269	Depositor DCC
R_{free} test set	1673 reflections (4.85%)	DCC
Wilson B-factor (Å^2)	62.6	Xtriage
Anisotropy	0.537	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 62.7	EDS
Estimated twinning fraction	0.029 for h,-k,-h-l	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Outliers	0 of 34563 reflections	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	6859	wwPDB-VP
Average B, all atoms (Å^2)	86.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.35% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: K

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|>5$	RMSZ	#$\|Z\|>5$
1	A	0.41	0/2672	0.55	0/3596
1	B	0.41	0/2669	0.55	0/3591
2	D	0.77	0/406	1.63	10/624 (1.6%)
2	G	0.70	0/406	1.59	8/624 (1.3%)
3	E	0.69	0/280	1.42	3/432 (0.7%)
3	H	0.74	0/280	1.52	4/432 (0.9%)
4	F	0.80	0/151	1.43	0/230
4	I	0.61	0/151	1.39	3/230 (1.3%)
All	All	0.50	0/7015	0.92	28/9759 (0.3%)

There are no bond length outliers.

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	I	5	DT	N3-C4-O4	7.93	124.66	119.90
2	G	7	DC	C1'-O4'-C4'	-7.84	102.26	110.10
2	D	7	DC	O4'-C1'-N1	7.56	113.29	108.00
2	G	7	DC	O4'-C1'-N1	7.52	113.27	108.00
2	G	7	DC	O4'-C4'-C3'	-7.34	101.56	104.50
2	G	3	DT	C1'-O4'-C4'	-7.33	102.77	110.10
3	H	5	DG	O4'-C1'-N9	7.09	112.96	108.00
2	D	7	DC	C1'-O4'-C4'	-6.61	103.49	110.10
3	E	3	DG	O4'-C1'-N9	6.57	112.60	108.00
2	D	10	DC	O4'-C1'-N1	6.34	112.44	108.00
3	H	3	DG	O4'-C1'-N9	6.23	112.36	108.00
2	D	7	DC	O4'-C4'-C3'	-6.22	102.01	104.50
2	G	13	DG	C5-C6-O6	-6.20	124.88	128.60
2	D	9	DT	N3-C4-O4	6.12	123.57	119.90
4	I	5	DT	C5-C4-O4	-6.02	120.69	124.90
3	E	5	DG	O4'-C1'-N9	5.72	112.01	108.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	10	DC	O4'-C1'-N1	5.66	111.96	108.00
2	D	18	DT	N3-C4-O4	5.65	123.29	119.90
2	D	3	DT	C1'-O4'-C4'	-5.64	104.46	110.10
2	D	6	DG	N3-C4-N9	-5.63	122.62	126.00
2	D	6	DG	O4'-C1'-N9	5.62	111.93	108.00
3	H	3	DG	N3-C4-N9	-5.41	122.75	126.00
3	H	1	DT	N3-C4-O4	5.37	123.12	119.90
3	E	12	DT	N3-C4-O4	5.34	123.10	119.90
2	G	13	DG	N1-C6-O6	5.33	123.09	119.90
2	G	14	DA	N1-C6-N6	5.33	121.80	118.60
4	I	2	DC	C1'-O4'-C4'	-5.33	104.77	110.10
2	D	9	DT	C5-C4-O4	-5.05	121.36	124.90

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	2627	0	2639	61	0
1	B	2624	0	2638	59	0
2	D	363	0	204	14	0
2	G	363	0	204	6	0
3	E	249	0	137	15	0
3	H	249	0	137	15	0
4	F	136	0	80	17	0
4	I	136	0	80	6	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
6	A	37	0	0	5	0
6	B	55	0	0	2	0
6	D	8	0	0	1	0
6	E	5	0	0	0	0
6	F	1	0	0	0	0
6	G	2	0	0	0	0
6	H	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	6859	0	6119	172	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 13.

All (172) 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:H:3:DG:H2"	3:H:4:DA:H5'	1.42	1.01
3:E:3:DG:H2"	3:E:4:DA:H5'	1.42	1.01
3:H:2:DT:H2'	3:H:3:DG:H5"	1.59	0.83
3:E:2:DT:H2'	3:E:3:DG:H5"	1.61	0.81
2:D:18:DT:H3	4:F:1:DA:N6	1.80	0.78
2:D:18:DT:N3	4:F:1:DA:N6	2.32	0.76
1:A:243:PRO:O	1:A:247:VAL:HG23	1.85	0.76
1:B:191:MET:CE	1:B:194:LEU:HD12	2.20	0.72
1:B:191:MET:HE2	1:B:194:LEU:HD12	1.71	0.72
1:A:191:MET:CE	1:A:194:LEU:HD12	2.20	0.72
3:H:3:DG:H2'	3:H:4:DA:C8	2.26	0.71
3:E:3:DG:H2'	3:E:4:DA:C8	2.25	0.71
4:I:1:DA:H2"	4:I:2:DC:H6	1.57	0.70
1:A:334:GLY:O	1:A:335:SER:HB2	1.91	0.69
4:F:1:DA:H2"	4:F:2:DC:H6	1.58	0.69
4:F:1:DA:H2"	4:F:2:DC:C6	2.28	0.69
1:B:334:GLY:O	1:B:335:SER:HB2	1.93	0.68
4:I:1:DA:H2"	4:I:2:DC:C6	2.28	0.67
1:B:19:ARG:HG2	1:B:19:ARG:HH11	1.60	0.66
1:B:37:MET:O	1:B:41:GLN:HG3	1.95	0.66
1:B:192:ARG:HH11	1:B:205:GLN:NE2	1.93	0.66
1:B:306:LEU:HD23	1:B:325:VAL:HG22	1.78	0.65
1:B:243:PRO:O	1:B:247:VAL:HG23	1.95	0.65
1:A:45:ALA:HB2	2:G:12:DA:H2"	1.79	0.65
1:B:192:ARG:NH1	1:B:205:GLN:HE22	1.95	0.65
1:A:306:LEU:HD23	1:A:325:VAL:HG22	1.79	0.64
1:B:192:ARG:HH11	1:B:205:GLN:HE22	1.43	0.63
1:A:300:GLU:HB2	1:A:332:ARG:NH1	2.14	0.63
1:A:191:MET:HE2	1:A:194:LEU:HD12	1.81	0.63
1:A:307:ILE:O	1:A:311:CYS:HB2	1.99	0.63
1:A:192:ARG:HH11	1:A:205:GLN:NE2	1.97	0.62
1:B:307:ILE:O	1:B:311:CYS:HB2	1.99	0.62
1:A:192:ARG:NH1	1:A:205:GLN:HE22	1.98	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:19:ARG:HH11	1:A:19:ARG:HG2	1.65	0.61
1:A:192:ARG:HH11	1:A:205:GLN:HE22	1.49	0.60
3:H:3:DG:H4'	3:H:3:DG:OP1	2.01	0.60
1:B:300:GLU:HB2	1:B:332:ARG:NH1	2.16	0.60
3:E:3:DG:H4'	3:E:3:DG:OP1	2.00	0.59
3:E:3:DG:H5"	3:E:3:DG:C8	2.38	0.59
1:B:3:ILE:HD12	1:B:227:CYS:HB3	1.85	0.59
1:B:324:GLY:HA2	1:B:327:ARG:HD3	1.85	0.59
1:B:208:HIS:CD2	6:B:350:HOH:O	2.56	0.59
1:B:46:VAL:HB	1:B:62:SER:HB3	1.85	0.59
3:H:3:DG:C2'	3:H:4:DA:H5'	2.27	0.58
3:H:3:DG:C8	3:H:3:DG:H5"	2.39	0.58
4:F:6:DC:H2'	4:F:7:DC:C6	2.39	0.58
1:B:303:GLU:OE1	1:B:326:LYS:HE3	2.04	0.58
1:A:3:ILE:HD12	1:A:227:CYS:HB3	1.86	0.58
2:D:4:DC:H2"	2:D:5:DT:O5'	2.04	0.58
3:E:3:DG:H5"	3:E:3:DG:H8	1.70	0.57
1:A:46:VAL:HG12	1:A:53:LEU:HG	1.86	0.57
1:A:303:GLU:OE1	1:A:326:LYS:HE3	2.05	0.56
1:B:260:VAL:HG22	1:B:270:VAL:HG11	1.88	0.56
2:G:4:DC:H2"	2:G:5:DT:O5'	2.06	0.56
1:A:194:LEU:C	1:A:194:LEU:HD23	2.26	0.55
1:A:260:VAL:HG22	1:A:270:VAL:HG11	1.88	0.55
2:D:16:DG:H8	6:D:22:HOH:O	1.89	0.55
1:A:153:LEU:HD11	1:A:296:LEU:HD21	1.89	0.55
3:H:3:DG:H5"	3:H:3:DG:H8	1.71	0.55
1:A:46:VAL:HB	1:A:62:SER:HB3	1.88	0.55
1:A:324:GLY:HA2	1:A:327:ARG:HD3	1.87	0.55
1:A:44:ILE:HG21	2:G:12:DA:C5	2.42	0.55
1:B:316:PHE:CD1	4:F:7:DC:H5"	2.43	0.54
1:B:320:ARG:NH1	2:D:16:DG:H5'	2.23	0.54
1:B:153:LEU:HD11	1:B:296:LEU:HD21	1.89	0.54
1:A:289:LEU:HD12	1:A:289:LEU:C	2.28	0.54
4:I:6:DC:H2'	4:I:7:DC:C6	2.43	0.53
1:B:194:LEU:HD23	1:B:194:LEU:C	2.28	0.53
1:A:73:ARG:HB3	1:A:196:ALA:O	2.09	0.53
1:B:46:VAL:HG12	1:B:53:LEU:HG	1.89	0.52
3:H:3:DG:C5'	3:H:3:DG:H8	2.22	0.52
1:B:19:ARG:HG2	1:B:19:ARG:NH1	2.23	0.52
3:E:2:DT:C2'	3:E:3:DG:H5"	2.37	0.52
3:E:3:DG:C5'	3:E:3:DG:H8	2.21	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:18:DT:C2	4:F:1:DA:N1	2.78	0.52
1:A:73:ARG:HG2	6:A:371:HOH:O	2.10	0.51
1:B:106:GLU:HG3	1:B:110:GLN:OE1	2.11	0.51
3:H:2:DT:H2"	3:H:3:DG:OP1	2.10	0.51
1:B:303:GLU:O	1:B:307:ILE:HG12	2.11	0.51
1:A:272:GLU:OE2	1:B:132:LYS:HE2	2.11	0.50
3:E:3:DG:C5'	3:E:3:DG:C8	2.95	0.50
2:G:8:DC:H2"	2:G:9:DT:H5'	1.94	0.50
1:A:94:SER:OG	1:B:275:LEU:HD11	2.12	0.50
1:A:321:ILE:O	1:A:325:VAL:HG23	2.12	0.50
3:H:3:DG:C8	3:H:3:DG:C5'	2.95	0.50
1:B:321:ILE:O	1:B:325:VAL:HG23	2.12	0.49
1:A:106:GLU:HG3	1:A:110:GLN:OE1	2.13	0.49
1:A:191:MET:HE1	1:A:194:LEU:HD12	1.95	0.49
1:B:289:LEU:HD12	1:B:289:LEU:C	2.32	0.49
2:D:8:DC:H2"	2:D:9:DT:H5'	1.94	0.49
1:B:73:ARG:HB3	1:B:196:ALA:O	2.12	0.49
1:A:303:GLU:O	1:A:307:ILE:HG12	2.11	0.49
1:A:158:GLU:HB2	6:A:357:HOH:O	2.11	0.49
1:B:47:ARG:HD2	1:B:128:LYS:HE2	1.95	0.48
1:A:334:GLY:O	1:A:335:SER:CB	2.61	0.48
1:B:228:ILE:HG23	1:B:235:CYS:SG	2.54	0.48
3:E:2:DT:H2"	3:E:3:DG:OP1	2.12	0.48
1:A:228:ILE:HG23	1:A:235:CYS:SG	2.54	0.48
4:I:2:DC:H2"	4:I:3:DC:H5'	1.96	0.48
3:E:3:DG:C2'	3:E:4:DA:H5'	2.27	0.48
3:H:2:DT:C2'	3:H:3:DG:H5"	2.37	0.47
1:B:316:PHE:CD1	1:B:321:ILE:HD11	2.49	0.47
1:B:52:VAL:CG2	1:B:60:THR:HG23	2.44	0.47
4:F:4:DG:H1'	4:F:5:DT:H5'	1.96	0.47
1:A:19:ARG:NH1	1:A:19:ARG:HG2	2.26	0.47
4:F:2:DC:H2"	4:F:3:DC:H5'	1.96	0.47
3:H:3:DG:OP1	3:H:3:DG:C4'	2.63	0.47
2:D:18:DT:O2	4:F:1:DA:N1	2.47	0.47
1:A:30:LYS:HA	1:A:80:LYS:O	2.15	0.47
1:A:110:GLN:HA	1:A:113:GLN:HE21	1.80	0.47
1:A:52:VAL:HG21	1:A:60:THR:HG23	1.95	0.46
1:A:52:VAL:CG2	1:A:60:THR:HG23	2.45	0.46
1:B:44:ILE:HD13	1:B:131:VAL:HG21	1.98	0.46
1:B:110:GLN:HA	1:B:113:GLN:HE21	1.81	0.46
1:B:52:VAL:HG21	1:B:60:THR:HG23	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:88:LYS:HA	1:B:89:PRO:HD3	1.85	0.46
1:B:273:ASN:ND2	6:B:344:HOH:O	2.49	0.46
1:A:47:ARG:HD2	1:A:128:LYS:HE2	1.98	0.45
1:A:68:PHE:O	1:A:72:ILE:HD12	2.16	0.45
1:A:269:PRO:HA	6:A:355:HOH:O	2.15	0.45
3:H:3:DG:C2'	3:H:4:DA:C8	2.99	0.45
3:E:3:DG:C4'	3:E:3:DG:OP1	2.63	0.45
1:B:253:HIS:HB3	1:B:258:GLU:CG	2.46	0.45
3:E:9:DG:H2"	3:E:10:DA:OP2	2.16	0.45
1:A:253:HIS:HB3	1:A:258:GLU:CG	2.47	0.45
4:I:4:DG:H1'	4:I:5:DT:H5'	1.99	0.44
1:B:30:LYS:HA	1:B:80:LYS:O	2.18	0.44
1:A:97:LEU:HA	1:A:97:LEU:HD23	1.84	0.44
1:B:79:ILE:O	1:B:81:PRO:HD3	2.18	0.44
1:B:323:SER:O	1:B:327:ARG:HG3	2.17	0.44
3:E:3:DG:C2'	3:E:4:DA:C8	2.97	0.43
1:B:177:THR:HG23	1:B:190:LEU:HD11	2.00	0.43
1:A:275:LEU:HD13	1:B:91:GLN:HG2	2.01	0.43
1:A:4:GLN:HG2	6:A:359:HOH:O	2.17	0.43
4:F:3:DC:H1'	4:F:4:DG:C8	2.53	0.43
2:G:8:DC:H2'	2:G:9:DT:C6	2.53	0.43
1:B:219:ASN:OD1	1:B:222:GLN:HG3	2.18	0.43
1:B:200:LYS:O	1:B:201:LYS:CB	2.67	0.43
4:I:3:DC:H1'	4:I:4:DG:C8	2.54	0.43
1:B:260:VAL:CG2	1:B:270:VAL:HG11	2.47	0.43
1:A:47:ARG:NH1	1:A:52:VAL:HG13	2.34	0.43
1:A:192:ARG:NH1	1:A:205:GLN:NE2	2.61	0.42
1:A:157:SER:HB3	6:A:357:HOH:O	2.18	0.42
1:A:260:VAL:CG2	1:A:270:VAL:HG11	2.49	0.42
3:H:9:DG:H2"	3:H:10:DA:OP2	2.19	0.42
1:A:200:LYS:O	1:A:201:LYS:CB	2.68	0.42
1:A:192:ARG:O	1:A:193:HIS:HB2	2.19	0.42
1:B:108:GLU:O	1:B:111:LEU:HB3	2.19	0.42
1:A:177:THR:HG23	1:A:190:LEU:HD11	2.02	0.42
2:D:17:DG:N2	4:F:2:DC:N3	2.68	0.42
1:B:314:LYS:O	4:F:7:DC:O3'	2.25	0.42
1:A:79:ILE:O	1:A:81:PRO:HD3	2.19	0.42
1:B:306:LEU:HD12	1:B:306:LEU:HA	1.86	0.42
1:B:317:SER:H	4:F:7:DC:P	2.43	0.42
1:A:307:ILE:HG23	1:A:311:CYS:SG	2.60	0.42
1:B:110:GLN:HB3	1:B:126:PHE:CE1	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:GLU:O	1:A:111:LEU:HB3	2.20	0.41
1:B:68:PHE:O	1:B:72:ILE:HD12	2.21	0.41
1:B:97:LEU:HD23	1:B:97:LEU:HA	1.81	0.41
1:A:110:GLN:HB3	1:A:126:PHE:CE1	2.55	0.41
1:A:316:PHE:CD1	1:A:321:ILE:HD11	2.55	0.41
3:E:6:DG:H2"	3:E:7:DC:C5'	2.51	0.41
1:B:320:ARG:NH1	2:D:16:DG:C5'	2.84	0.40
1:A:221:GLU:HG3	1:A:284:LEU:HD11	2.03	0.40
1:A:198:GLU:HG2	2:G:15:DC:OP2	2.22	0.40
2:D:17:DG:H1	4:F:2:DC:N4	2.19	0.40
2:D:18:DT:C4	4:F:1:DA:N6	2.83	0.40
1:A:40:TYR:CE2	3:H:1:DT:C2	3.10	0.40
2:D:18:DT:N3	4:F:1:DA:C6	2.87	0.40
1:B:164:ALA:CB	1:B:187:SER:HB2	2.51	0.40
1:A:263:LEU:O	1:A:265:PRO:HD3	2.22	0.40
1:B:69:TYR:CD1	2:D:15:DC:H5"	2.57	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 X-ray entries followed by that with respect to entries of similar resolution.

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	333/341 (98%)	309 (93%)	21 (6%)	3 (1%)	21 42
1	B	332/341 (97%)	306 (92%)	25 (8%)	1 (0%)	46 72
All	All	665/682 (98%)	615 (92%)	46 (7%)	4 (1%)	30 56

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	201	LYS
1	A	335	SER

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Mol	Chain	Res	Type
1	B	201	LYS
1	A	92	LEU

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 X-ray entries followed by that with respect to entries of similar resolution.

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	282/292 (97%)	272 (96%)	10 (4%)	43	71
1	B	282/292 (97%)	272 (96%)	10 (4%)	43	71
All	All	564/584 (97%)	544 (96%)	20 (4%)	43	71

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

Mol	Chain	Res	Type
1	A	29	ARG
1	A	130	LEU
1	A	146	SER
1	A	158	GLU
1	A	237	SER
1	A	244	LYS
1	A	260	VAL
1	A	262	ARG
1	A	282	LEU
1	A	335	SER
1	B	29	ARG
1	B	130	LEU
1	B	146	SER
1	B	158	GLU
1	B	237	SER
1	B	244	LYS
1	B	260	VAL
1	B	262	ARG
1	B	282	LEU
1	B	335	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	113	GLN
1	A	205	GLN
1	A	214	GLN
1	A	251	GLN
1	A	273	ASN
1	A	281	GLN
1	B	41	GLN
1	B	113	GLN
1	B	205	GLN
1	B	214	GLN
1	B	251	GLN
1	B	273	ASN
1	B	281	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

Of 2 ligands modelled in this entry, 2 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.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	335/341 (98%)	0.12	6 (1%) 71 66	38, 72, 138, 213	0
1	B	334/341 (97%)	0.18	5 (1%) 76 71	35, 71, 138, 214	0
2	D	18/18 (100%)	0.14	0 100 100	67, 106, 140, 151	0
2	G	18/18 (100%)	0.28	0 100 100	77, 110, 148, 157	0
3	E	12/12 (100%)	-0.12	0 100 100	86, 112, 126, 140	0
3	H	12/12 (100%)	0.26	0 100 100	89, 117, 130, 139	0
4	F	7/7 (100%)	-0.09	0 100 100	105, 114, 134, 134	0
4	I	7/7 (100%)	0.08	0 100 100	94, 112, 131, 135	0
All	All	743/756 (98%)	0.15	11 (1%) 76 71	35, 76, 138, 214	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	335	SER	12.2
1	B	334	GLY	5.5
1	A	216	LEU	2.8
1	A	335	SER	2.7
1	B	48	GLN	2.5
1	B	56	GLU	2.5
1	A	263	LEU	2.3
1	A	309	PHE	2.3
1	A	114	ALA	2.2
1	A	319	GLU	2.2
1	B	318	GLU	2.1

6.2 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates (i)

There are no carbohydrates in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å^2)	Q<0.9
5	K	A	1102	1/1	0.79	0.12	-0.90	134,134,134,134	0
5	K	B	1101	1/1	0.92	0.14	-2.01	98,98,98,98	0

6.5 Other polymers (i)

There are no such residues in this entry.