Full wwPDB X-ray Structure Validation Report ⓘ

Aug 23, 2023 – 07:00 AM EDT

PDB ID	:	3EH8
Title	:	Crystal structure of Y2 I-AniI variant (F13Y/S111Y)/DNA complex with calcium
Authors	:	Takeuchi, R.; Stoddard, B.L.
Deposited on	:	2008-09-11
Resolution	:	2.70 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
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

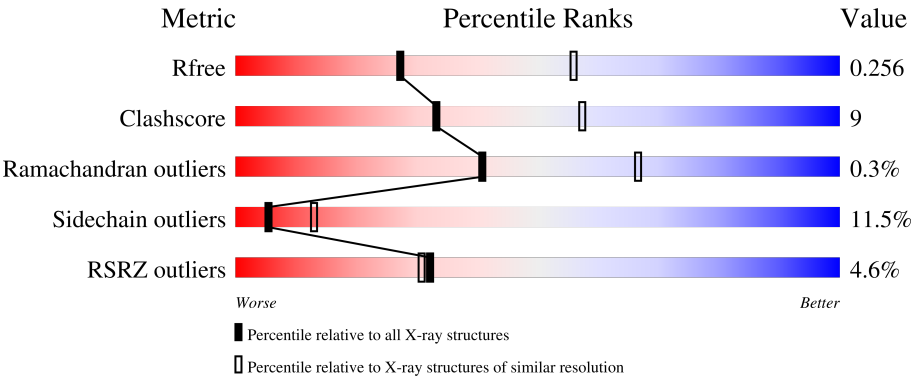
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.35
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

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 2.70 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}	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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 of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. 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	254	3% 80% 16% .
1	D	254	4% 76% 20% .
1	G	254	4% 69% 25% 6%
2	B	31	3% 35% 29% 35%
2	E	31	6% 39% 42% 19%

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Mol	Chain	Length	Quality of chain
2	H	31	13% 26% 61% 13%
3	C	31	6% 55% 45%
3	F	31	16% 39% 35% 26%
3	I	31	6% 45% 35% 19%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 10141 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 Intron-encoded DNA endonuclease I-AniI.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	254	Total	C	N	O	S	0	0	0
			2091	1366	341	380	4			
1	D	254	Total	C	N	O	S	0	0	0
			2091	1366	341	380	4			
1	G	254	Total	C	N	O	S	0	0	0
			2091	1366	341	380	4			

There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLY	-	expression tag	UNP P03880
A	2	SER	-	expression tag	UNP P03880
A	13	TYR	PHE	engineered mutation	UNP P03880
A	61	ARG	ILE	conflict	UNP P03880
A	80	LYS	PHE	engineered mutation	UNP P03880
A	111	TYR	SER	engineered mutation	UNP P03880
A	232	LYS	LEU	engineered mutation	UNP P03880
D	1	GLY	-	expression tag	UNP P03880
D	2	SER	-	expression tag	UNP P03880
D	13	TYR	PHE	engineered mutation	UNP P03880
D	61	ARG	ILE	conflict	UNP P03880
D	80	LYS	PHE	engineered mutation	UNP P03880
D	111	TYR	SER	engineered mutation	UNP P03880
D	232	LYS	LEU	engineered mutation	UNP P03880
G	1	GLY	-	expression tag	UNP P03880
G	2	SER	-	expression tag	UNP P03880
G	13	TYR	PHE	engineered mutation	UNP P03880
G	61	ARG	ILE	conflict	UNP P03880
G	80	LYS	PHE	engineered mutation	UNP P03880
G	111	TYR	SER	engineered mutation	UNP P03880
G	232	LYS	LEU	engineered mutation	UNP P03880

- Molecule 2 is a DNA chain called 31-MER.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	31	Total	C	N	O	P	0	0	0
			638	303	120	185	30			
2	E	31	Total	C	N	O	P	0	0	0
			638	303	120	185	30			
2	H	31	Total	C	N	O	P	0	0	0
			638	303	120	185	30			

- Molecule 3 is a DNA chain called 31-MER.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	31	Total	C	N	O	P	0	0	0
			627	299	115	183	30			
3	F	31	Total	C	N	O	P	0	0	0
			627	299	115	183	30			
3	I	31	Total	C	N	O	P	0	0	0
			627	299	115	183	30			

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Ca	0	0
			2	2		
4	D	2	Total	Ca	0	0
			2	2		
4	G	2	Total	Ca	0	0
			2	2		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	22	Total	O	0	0
			22	22		
5	D	19	Total	O	0	0
			19	19		
5	G	10	Total	O	0	0
			10	10		
5	B	5	Total	O	0	0
			5	5		
5	C	2	Total	O	0	0
			2	2		
5	E	2	Total	O	0	0
			2	2		
5	F	3	Total	O	0	0
			3	3		

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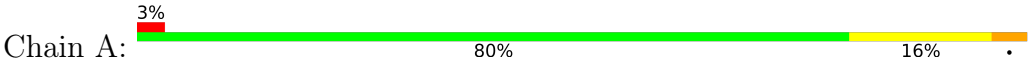
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	H	1	Total O 1 1	0	0
5	I	3	Total O 3 3	0	0

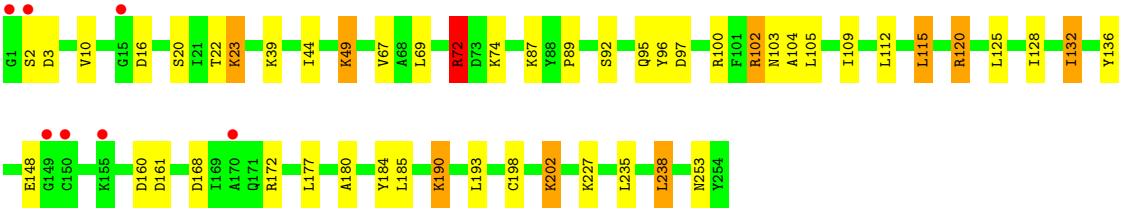
3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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 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: Intron-encoded DNA endonuclease I-AniI

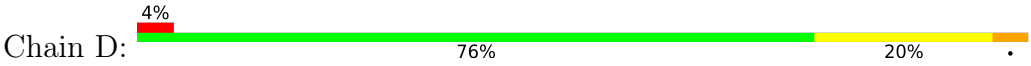
Chain A:

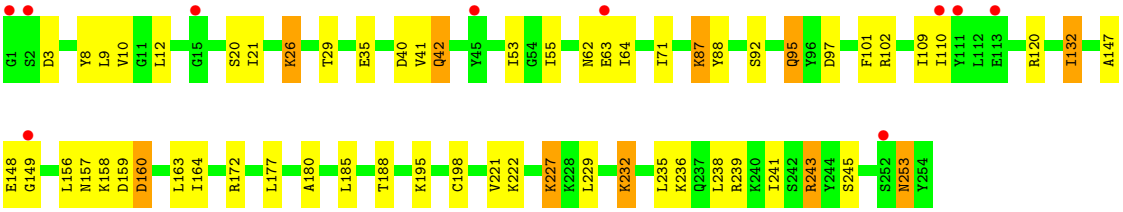




• Molecule 1: Intron-encoded DNA endonuclease I-AniI

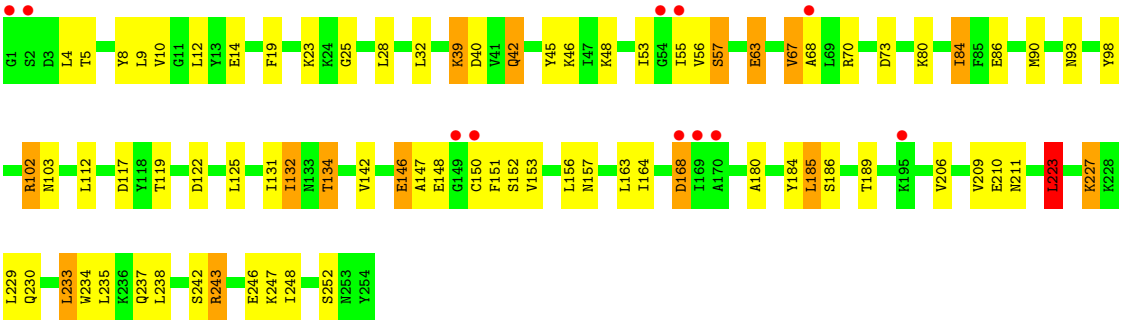
Chain D:





• Molecule 1: Intron-encoded DNA endonuclease I-AniI

Chain G:

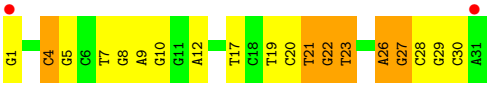


• Molecule 2: 31-MER

Chain B:

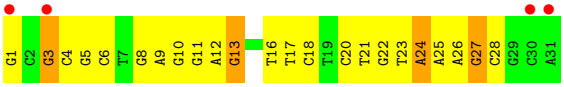
• Molecule 2: 31-MER

Chain E:



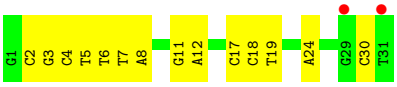
• Molecule 2: 31-MER

Chain H:



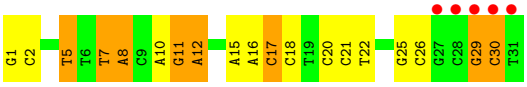
• Molecule 3: 31-MER

Chain C:



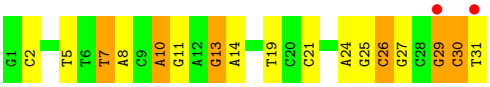
• Molecule 3: 31-MER

Chain F:



• Molecule 3: 31-MER

Chain I:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	107.56Å 192.60Å 161.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	37.14 – 2.70 35.92 – 2.70	Depositor EDS
% Data completeness (in resolution range)	90.2 (37.14-2.70) 90.2 (35.92-2.70)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.70 (at 2.68Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.198 , 0.253 0.207 , 0.256	Depositor DCC
R_{free} test set	2126 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	60.2	Xtriage
Anisotropy	0.092	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 70.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.033 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.044 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	10141	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.38% 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, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.56	0/2132	0.69	2/2867 (0.1%)
1	D	0.53	0/2132	0.66	0/2867
1	G	0.54	0/2132	0.71	1/2867 (0.0%)
2	B	0.89	0/716	1.73	26/1105 (2.4%)
2	E	0.82	0/716	1.56	11/1105 (1.0%)
2	H	0.86	0/716	1.82	22/1105 (2.0%)
3	C	0.84	0/702	1.55	9/1080 (0.8%)
3	F	0.82	0/702	1.71	26/1080 (2.4%)
3	I	0.89	0/702	1.66	17/1080 (1.6%)
All	All	0.68	0/10650	1.22	114/15156 (0.8%)

There are no bond length outliers.

All (114) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	12	DA	O4'-C1'-N9	14.08	117.86	108.00
2	H	21	DT	O4'-C4'-C3'	-13.33	98.00	106.00
2	H	21	DT	O4'-C1'-N1	12.12	116.48	108.00
3	F	30	DC	O4'-C1'-N1	10.76	115.53	108.00
2	H	22	DG	O4'-C4'-C3'	-10.06	99.96	106.00
3	F	29	DG	O4'-C1'-N9	10.06	115.04	108.00
3	I	25	DG	O4'-C1'-N9	9.79	114.85	108.00
3	I	19	DT	O4'-C4'-C3'	-9.66	100.20	106.00
2	H	12	DA	O4'-C1'-N9	9.55	114.68	108.00
3	F	25	DG	O4'-C1'-N9	9.31	114.52	108.00
3	I	10	DA	P-O3'-C3'	9.27	130.82	119.70
3	F	10	DA	O4'-C1'-N9	9.21	114.45	108.00
2	B	17	DT	O4'-C1'-N1	-8.90	101.77	108.00
2	B	22	DG	O4'-C1'-N9	8.74	114.12	108.00
2	E	20	DC	O4'-C1'-N1	8.68	114.08	108.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	22	DG	C1'-O4'-C4'	-8.56	101.54	110.10
2	H	17	DT	O4'-C1'-N1	-8.38	102.14	108.00
2	H	24	DA	P-O3'-C3'	8.30	129.66	119.70
2	H	21	DT	P-O3'-C3'	8.14	129.47	119.70
3	I	26	DC	O4'-C4'-C3'	-8.04	101.18	106.00
3	I	31	DT	O4'-C1'-N1	7.99	113.59	108.00
3	F	11	DG	P-O3'-C3'	7.90	129.18	119.70
3	F	8	DA	O4'-C1'-N9	-7.54	102.72	108.00
3	I	29	DG	P-O3'-C3'	7.54	128.74	119.70
2	H	3	DG	P-O3'-C3'	7.47	128.66	119.70
3	F	5	DT	O4'-C1'-N1	-7.33	102.87	108.00
3	C	12	DA	O4'-C1'-N9	-7.33	102.87	108.00
3	F	12	DA	O4'-C1'-N9	-7.28	102.91	108.00
3	I	24	DA	P-O3'-C3'	7.01	128.12	119.70
2	H	11	DG	O4'-C1'-N9	6.99	112.89	108.00
2	B	24	DA	P-O3'-C3'	6.96	128.05	119.70
3	C	24	DA	O4'-C1'-N9	-6.90	103.17	108.00
3	F	18	DC	O4'-C4'-C3'	6.70	110.02	106.00
3	F	25	DG	C1'-O4'-C4'	-6.68	103.42	110.10
2	H	27	DG	P-O3'-C3'	6.66	127.69	119.70
3	I	13	DG	C1'-O4'-C4'	-6.64	103.46	110.10
3	I	10	DA	O4'-C1'-N9	6.64	112.64	108.00
2	H	28	DC	P-O3'-C3'	6.63	127.66	119.70
2	H	21	DT	C1'-O4'-C4'	-6.56	103.54	110.10
2	H	23	DT	P-O3'-C3'	6.51	127.51	119.70
3	F	10	DA	C1'-O4'-C4'	-6.50	103.60	110.10
3	I	10	DA	O4'-C4'-C3'	-6.37	101.95	104.50
3	F	1	DG	C1'-O4'-C4'	-6.33	103.77	110.10
3	I	13	DG	O4'-C1'-C2'	-6.32	100.84	105.90
2	B	1	DG	O4'-C1'-N9	6.26	112.38	108.00
2	B	11	DG	C1'-O4'-C4'	-6.16	103.94	110.10
3	C	24	DA	P-O3'-C3'	6.15	127.08	119.70
2	H	20	DC	P-O3'-C3'	6.14	127.07	119.70
2	B	1	DG	C1'-O4'-C4'	-6.10	104.00	110.10
2	H	13	DG	N3-C4-C5	-6.09	125.56	128.60
1	A	72	ARG	NE-CZ-NH1	6.08	123.34	120.30
2	B	31	DA	O4'-C1'-N9	6.08	112.26	108.00
3	I	2	DC	O4'-C1'-N1	6.07	112.25	108.00
2	H	21	DT	C4'-C3'-C2'	-6.01	97.69	103.10
2	H	6	DC	O4'-C1'-N1	5.98	112.19	108.00
3	F	29	DG	O4'-C1'-C2'	-5.92	101.16	105.90
3	F	7	DT	N3-C4-O4	5.89	123.43	119.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	I	30	DC	O4'-C1'-N1	5.89	112.12	108.00
3	F	26	DC	O4'-C4'-C3'	-5.88	102.15	104.50
2	B	23	DT	C1'-O4'-C4'	-5.85	104.25	110.10
3	F	30	DC	C1'-O4'-C4'	-5.83	104.27	110.10
3	C	30	DC	O4'-C1'-N1	5.81	112.07	108.00
3	F	22	DT	O4'-C1'-N1	5.81	112.07	108.00
2	B	13	DG	P-O3'-C3'	5.76	126.62	119.70
2	B	10	DG	P-O3'-C3'	5.76	126.61	119.70
3	C	18	DC	P-O3'-C3'	5.75	126.60	119.70
3	C	11	DG	O4'-C1'-N9	-5.73	103.99	108.00
3	F	1	DG	P-O3'-C3'	5.71	126.56	119.70
3	F	18	DC	O4'-C1'-N1	5.71	112.00	108.00
3	I	14	DA	P-O3'-C3'	5.69	126.53	119.70
2	B	1	DG	P-O3'-C3'	5.68	126.52	119.70
2	B	23	DT	O4'-C1'-C2'	-5.63	101.40	105.90
3	I	26	DC	O4'-C1'-N1	5.63	111.94	108.00
2	H	17	DT	N3-C4-O4	5.62	123.27	119.90
2	E	30	DC	O4'-C1'-N1	5.61	111.92	108.00
3	C	18	DC	C1'-O4'-C4'	-5.60	104.50	110.10
2	H	16	DT	P-O3'-C3'	5.57	126.38	119.70
2	E	22	DG	O4'-C1'-N9	5.57	111.90	108.00
2	B	26	DA	O4'-C1'-N9	5.52	111.87	108.00
2	E	12	DA	C1'-O4'-C4'	-5.47	104.63	110.10
2	B	27	DG	O4'-C1'-N9	5.47	111.83	108.00
3	C	4	DC	C1'-O4'-C4'	-5.47	104.63	110.10
2	B	16	DT	O4'-C1'-N1	-5.47	104.17	108.00
2	E	4	DC	P-O3'-C3'	5.46	126.25	119.70
1	G	223	LEU	CA-CB-CG	5.44	127.82	115.30
3	F	22	DT	C3'-C2'-C1'	-5.44	95.97	102.50
2	H	22	DG	C1'-O4'-C4'	-5.43	104.67	110.10
2	B	28	DC	P-O3'-C3'	5.42	126.20	119.70
2	B	22	DG	C5'-C4'-O4'	5.38	119.52	109.30
3	F	25	DG	O4'-C1'-C2'	-5.38	101.60	105.90
2	B	26	DA	P-O3'-C3'	5.35	126.12	119.70
2	B	22	DG	N1-C6-O6	-5.34	116.70	119.90
2	H	18	DC	C3'-C2'-C1'	-5.33	96.11	102.50
2	E	17	DT	O4'-C1'-N1	-5.32	104.28	108.00
2	E	12	DA	O4'-C1'-N9	5.32	111.72	108.00
2	H	20	DC	C1'-O4'-C4'	-5.32	104.78	110.10
2	E	26	DA	O4'-C1'-N9	5.30	111.71	108.00
1	A	115	LEU	CA-CB-CG	5.30	127.50	115.30
2	B	17	DT	N1-C1'-C2'	5.27	122.61	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	F	17	DC	N3-C2-O2	-5.20	118.26	121.90
2	B	8	DG	P-O3'-C3'	5.16	125.90	119.70
3	F	10	DA	O4'-C1'-C2'	-5.16	101.77	105.90
2	E	27	DG	P-O3'-C3'	5.16	125.89	119.70
2	B	21	DT	C1'-O4'-C4'	-5.12	104.98	110.10
3	F	2	DC	O4'-C1'-N1	-5.09	104.44	108.00
3	I	7	DT	O4'-C1'-N1	5.09	111.56	108.00
3	F	5	DT	P-O3'-C3'	5.09	125.80	119.70
2	B	23	DT	C6-C5-C7	-5.08	119.85	122.90
2	E	23	DT	C4-C5-C7	5.06	122.03	119.00
3	I	19	DT	O4'-C1'-N1	5.04	111.53	108.00
2	B	23	DT	C3'-C2'-C1'	-5.04	96.46	102.50
3	F	30	DC	P-O3'-C3'	5.03	125.74	119.70
2	E	21	DT	C4-C5-C7	5.03	122.02	119.00
3	C	4	DC	O4'-C1'-N1	5.02	111.51	108.00

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	2091	0	2174	33	0
1	D	2091	0	2174	35	0
1	G	2091	0	2174	41	0
2	B	638	0	350	12	0
2	E	638	0	350	16	0
2	H	638	0	350	11	0
3	C	627	0	349	6	0
3	F	627	0	349	9	0
3	I	627	0	349	10	0
4	A	2	0	0	0	0
4	D	2	0	0	0	0
4	G	2	0	0	0	0
5	A	22	0	0	4	0
5	B	5	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	2	0	0	0	0
5	D	19	0	0	1	0
5	E	2	0	0	3	0
5	F	3	0	0	0	0
5	G	10	0	0	3	0
5	H	1	0	0	0	0
5	I	3	0	0	0	0
All	All	10141	0	8619	160	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 9.

All (160) 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:D:26:LYS:HD2	1:D:26:LYS:H	1.23	1.00
1:A:72:ARG:HH11	1:A:72:ARG:HG3	1.37	0.90
3:I:10:DA:H2"	3:I:11:DG:C8	2.10	0.86
1:D:157:ASN:HD21	1:D:160:ASP:HB2	1.41	0.85
1:A:23:LYS:HB3	1:A:112:LEU:HD13	1.60	0.83
2:H:9:DA:H2"	2:H:10:DG:H5'	1.61	0.81
2:E:19:DT:OP2	5:E:34:HOH:O	2.00	0.80
1:D:95:GLN:HE21	1:D:95:GLN:HA	1.47	0.79
1:D:26:LYS:HD2	1:D:26:LYS:N	2.00	0.76
1:G:151:PHE:H	1:G:230:GLN:NE2	1.87	0.73
1:A:16:ASP:OD2	5:A:314:HOH:O	2.05	0.73
1:D:156:LEU:HD13	1:D:164:ILE:HD11	1.70	0.73
2:E:22:DG:H2"	2:E:23:DT:H5'	1.71	0.72
1:G:57:SER:HB2	5:G:316:HOH:O	1.89	0.72
1:G:163:LEU:O	1:G:243:ARG:NH1	2.23	0.71
1:G:131:ILE:O	1:G:134:THR:HG23	1.91	0.70
1:G:132:ILE:HD11	1:G:180:ALA:O	1.92	0.70
2:H:25:DA:H2"	2:H:26:DA:H5"	1.74	0.70
5:E:34:HOH:O	3:F:17:DC:OP2	2.11	0.69
1:D:148:GLU:OE2	5:E:34:HOH:O	2.11	0.68
3:F:29:DG:H2"	3:F:30:DC:C6	2.29	0.68
1:G:151:PHE:H	1:G:230:GLN:HE21	1.40	0.68
3:I:10:DA:H2"	3:I:11:DG:H8	1.58	0.68
1:A:95:GLN:HE21	1:A:95:GLN:HA	1.58	0.67
1:G:210:GLU:HB2	1:G:248:ILE:HG12	1.74	0.67
2:H:24:DA:H2"	2:H:25:DA:O5'	1.95	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:26:DC:H2"	3:I:27:DG:H5'	1.78	0.66
2:B:28:DC:H2"	2:B:29:DG:C8	2.31	0.65
1:A:96:TYR:CZ	1:A:125:LEU:HD23	2.31	0.65
1:D:26:LYS:H	1:D:26:LYS:CD	2.03	0.65
2:H:1:DG:H2'	2:H:1:DG:N3	2.11	0.65
1:D:157:ASN:ND2	1:D:160:ASP:HB2	2.12	0.65
1:G:148:GLU:OE2	5:G:311:HOH:O	2.14	0.65
3:I:29:DG:H2"	3:I:30:DC:C6	2.32	0.65
1:G:93:ASN:ND2	1:G:122:ASP:HA	2.12	0.65
2:B:21:DT:H2"	2:B:22:DG:O4'	1.99	0.63
1:A:23:LYS:CB	1:A:112:LEU:HD13	2.28	0.62
2:H:9:DA:C2'	2:H:10:DG:H5'	2.28	0.62
2:B:10:DG:H2"	2:B:11:DG:O5'	2.00	0.61
1:A:95:GLN:HA	1:A:95:GLN:NE2	2.14	0.61
1:G:73:ASP:HA	2:H:8:DG:H5"	1.83	0.61
1:D:132:ILE:HD11	1:D:180:ALA:O	2.02	0.60
5:A:314:HOH:O	2:B:19:DT:OP2	2.17	0.59
1:D:163:LEU:O	1:D:243:ARG:NH1	2.36	0.59
2:E:9:DA:H8	2:E:9:DA:H5"	1.68	0.59
1:D:243:ARG:HD3	3:F:5:DT:H3'	1.83	0.58
2:H:13:DG:H8	2:H:13:DG:OP2	1.87	0.57
1:A:23:LYS:HE3	1:A:112:LEU:HD22	1.87	0.57
5:A:313:HOH:O	3:C:17:DC:H5'	2.04	0.56
3:C:2:DC:H2"	3:C:3:DG:C8	2.39	0.56
1:G:233:LEU:O	1:G:237:GLN:HG3	2.05	0.56
3:F:11:DG:H2"	3:F:12:DA:C8	2.41	0.56
2:E:4:DC:H2"	2:E:5:DG:OP2	2.04	0.56
1:G:93:ASN:HD22	1:G:122:ASP:HA	1.72	0.55
1:D:172:ARG:HA	1:D:198:CYS:HA	1.88	0.54
1:A:102:ARG:NH1	1:A:103:ASN:OD1	2.41	0.54
1:A:74:LYS:HG2	1:A:105:LEU:HD11	1.87	0.54
1:G:55:ILE:HG22	5:G:316:HOH:O	2.07	0.54
1:A:202:LYS:HE2	2:B:22:DG:O6	2.08	0.53
2:H:4:DC:H2"	2:H:5:DG:OP2	2.09	0.53
1:A:92:SER:HB3	1:A:177:LEU:HD22	1.90	0.53
3:C:7:DT:H2"	3:C:8:DA:C8	2.43	0.53
1:A:148:GLU:OE2	5:A:314:HOH:O	2.18	0.53
1:A:72:ARG:HG3	1:A:72:ARG:NH1	2.11	0.53
1:G:42:GLN:O	1:G:45:TYR:HB3	2.08	0.52
1:A:132:ILE:HD13	1:A:180:ALA:HB1	1.90	0.52
1:G:80:LYS:O	1:G:84:ILE:HG22	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:150:CYS:HB3	1:G:168:ASP:OD2	2.10	0.52
2:B:12:DA:H2"	2:B:13:DG:C8	2.45	0.52
1:A:72:ARG:HH11	1:A:72:ARG:CG	2.17	0.51
1:A:97:ASP:OD1	1:A:120:ARG:HG2	2.10	0.51
1:D:87:LYS:HG2	1:D:88:TYR:CE1	2.46	0.51
1:D:12:LEU:HD12	1:D:147:ALA:HB2	1.93	0.51
1:G:42:GLN:O	1:G:46:LYS:HG2	2.09	0.50
1:G:86:GLU:OE1	1:G:98:TYR:OH	2.21	0.50
2:E:9:DA:H5"	2:E:9:DA:C8	2.46	0.50
3:I:10:DA:C2'	3:I:11:DG:C8	2.89	0.50
1:A:132:ILE:HD11	1:A:180:ALA:O	2.10	0.50
1:G:146:GLU:HB2	1:G:223:LEU:HD12	1.93	0.50
2:H:26:DA:H2"	2:H:27:DG:C8	2.46	0.50
1:A:49:LYS:HE2	2:E:10:DG:OP2	2.11	0.50
1:A:22:THR:HG22	3:C:19:DT:H3'	1.92	0.49
1:D:239:ARG:O	1:D:245:SER:OG	2.31	0.49
1:D:8:TYR:HB2	1:D:221:VAL:HG21	1.93	0.49
1:A:172:ARG:HA	1:A:198:CYS:HA	1.94	0.48
2:E:22:DG:C2'	2:E:23:DT:H5'	2.40	0.48
1:G:243:ARG:HD3	3:I:5:DT:H3'	1.95	0.48
1:G:206:VAL:CG2	1:G:243:ARG:HG3	2.44	0.47
3:F:7:DT:H2"	3:F:8:DA:C8	2.49	0.47
2:H:26:DA:H2"	2:H:27:DG:H8	1.79	0.47
1:A:190:LYS:HE2	3:C:8:DA:H3'	1.96	0.47
1:A:2:SER:HB3	1:A:87:LYS:HE2	1.97	0.47
1:D:149:GLY:O	1:D:227:LYS:HE2	2.15	0.47
2:E:7:DT:H2'	2:E:8:DG:C8	2.49	0.47
2:E:28:DC:H2"	2:E:29:DG:C8	2.50	0.46
1:D:222:LYS:HA	5:D:308:HOH:O	2.15	0.46
1:D:236:LYS:HA	1:D:239:ARG:HH11	1.81	0.46
1:G:227:LYS:HD3	1:G:227:LYS:HA	1.72	0.46
1:G:23:LYS:HE3	1:G:25:GLY:O	2.16	0.46
1:A:89:PRO:HD2	1:A:136:TYR:OH	2.16	0.46
1:G:12:LEU:HD12	1:G:147:ALA:HB2	1.98	0.46
1:G:102:ARG:HG3	1:G:103:ASN:N	2.30	0.46
2:B:26:DA:H2"	2:B:27:DG:O5'	2.16	0.46
3:C:5:DT:H2"	3:C:6:DT:O5'	2.17	0.45
1:G:63:GLU:HA	1:G:63:GLU:OE1	2.16	0.45
1:A:132:ILE:HD11	1:A:184:TYR:HB2	1.98	0.45
1:D:55:ILE:HD13	2:E:9:DA:OP1	2.17	0.45
1:G:142:VAL:HG13	1:G:223:LEU:HD13	1.97	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:53:ILE:HD12	1:D:71:ILE:HG21	1.98	0.44
2:E:1:DG:H1	3:F:30:DC:H42	1.66	0.44
1:D:97:ASP:OD1	1:D:120:ARG:HD3	2.17	0.44
2:B:19:DT:H5'	5:B:33:HOH:O	2.17	0.44
1:G:19:PHE:CZ	1:G:32:LEU:HD13	2.52	0.44
1:G:8:TYR:OH	1:G:146:GLU:OE1	2.32	0.44
1:G:57:SER:O	1:G:67:VAL:HA	2.18	0.43
1:D:64:ILE:HD12	1:D:64:ILE:HA	1.87	0.43
3:I:29:DG:H2"	3:I:30:DC:H6	1.80	0.43
3:F:15:DA:H1'	3:F:16:DA:O4'	2.19	0.43
1:A:44:ILE:HG23	1:A:69:LEU:HB2	1.99	0.43
1:G:184:TYR:HD2	1:G:185:LEU:HD13	1.84	0.43
2:B:2:DC:H2"	2:B:3:DG:C8	2.54	0.43
1:D:35:GLU:O	3:F:16:DA:H5"	2.18	0.43
1:A:104:ALA:HA	1:A:109:ILE:HD12	2.00	0.43
1:D:158:LYS:HE3	2:E:23:DT:OP1	2.18	0.43
1:D:227:LYS:HA	1:D:227:LYS:HD3	1.59	0.43
1:G:5:THR:O	1:G:8:TYR:HB3	2.19	0.43
1:G:156:LEU:O	1:G:157:ASN:ND2	2.51	0.43
1:D:21:ILE:HD11	1:D:101:PHE:HA	2.02	0.42
1:D:157:ASN:ND2	1:D:159:ASP:OD1	2.48	0.42
1:D:253:ASN:HB3	3:I:13:DG:OP1	2.19	0.42
1:G:14:GLU:HB2	1:G:90:MET:HG2	2.00	0.42
1:A:95:GLN:NE2	1:A:95:GLN:CA	2.81	0.42
1:G:186:SER:HB2	1:G:211:ASN:ND2	2.34	0.42
1:D:132:ILE:HD12	1:D:132:ILE:HA	1.77	0.42
1:G:23:LYS:HD2	3:I:21:DC:OP2	2.19	0.42
1:G:153:VAL:HA	1:G:164:ILE:O	2.20	0.42
2:B:11:DG:H2"	2:B:12:DA:O5'	2.20	0.42
1:G:39:LYS:H	1:G:39:LYS:HG2	1.55	0.41
2:B:23:DT:H2"	2:B:24:DA:C8	2.55	0.41
1:A:128:ILE:O	1:A:132:ILE:HB	2.21	0.41
1:A:160:ASP:OD1	1:A:161:ASP:N	2.51	0.41
1:D:229:LEU:HA	1:D:232:LYS:HG3	2.02	0.41
2:E:8:DG:H2"	2:E:9:DA:OP2	2.20	0.41
1:G:48:LYS:HD3	1:G:56:VAL:HG23	2.02	0.41
2:B:22:DG:H2'	2:B:23:DT:C6	2.55	0.41
1:A:227:LYS:HA	1:A:227:LYS:HD3	1.87	0.41
2:E:21:DT:H2"	2:E:22:DG:O5'	2.21	0.41
1:A:132:ILE:HA	1:A:132:ILE:HD12	1.83	0.41
1:D:42:GLN:HE21	1:D:42:GLN:HB3	1.69	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:57:SER:HB3	1:G:68:ALA:HB3	2.03	0.41
1:D:110:ILE:O	1:D:110:ILE:HG13	2.21	0.40
2:E:26:DA:C2'	2:E:27:DG:H5'	2.51	0.40
1:D:92:SER:HB3	1:D:177:LEU:HD22	2.04	0.40
1:D:238:LEU:HA	1:D:241:ILE:HD12	2.03	0.40
2:E:19:DT:OP1	2:E:19:DT:H4'	2.21	0.40
3:F:20:DC:H2"	3:F:21:DC:H6	1.85	0.40
2:H:3:DG:H2"	2:H:4:DC:OP2	2.22	0.40
3:I:7:DT:H2"	3:I:8:DA:C8	2.57	0.40
1:A:238:LEU:HD12	1:A:238:LEU:HA	1.78	0.40
1:G:209:VAL:HG13	1:G:234:TRP:CH2	2.56	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	252/254 (99%)	240 (95%)	11 (4%)	1 (0%)	34	60
1	D	252/254 (99%)	240 (95%)	11 (4%)	1 (0%)	34	60
1	G	252/254 (99%)	242 (96%)	10 (4%)	0	100	100
All	All	756/762 (99%)	722 (96%)	32 (4%)	2 (0%)	41	66

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3	ASP
1	D	62	ASN

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	232/232 (100%)	212 (91%)	20 (9%)	10 24
1	D	232/232 (100%)	208 (90%)	24 (10%)	7 16
1	G	232/232 (100%)	196 (84%)	36 (16%)	2 7
All	All	696/696 (100%)	616 (88%)	80 (12%)	5 13

All (80) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	VAL
1	A	20	SER
1	A	23	LYS
1	A	39	LYS
1	A	49	LYS
1	A	67	VAL
1	A	72	ARG
1	A	100	ARG
1	A	102	ARG
1	A	115	LEU
1	A	120	ARG
1	A	132	ILE
1	A	168	ASP
1	A	185	LEU
1	A	190	LYS
1	A	193	LEU
1	A	202	LYS
1	A	235	LEU
1	A	238	LEU
1	A	253	ASN
1	D	3	ASP
1	D	9	LEU
1	D	10	VAL
1	D	20	SER
1	D	26	LYS
1	D	29	THR

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Mol	Chain	Res	Type
1	D	40	ASP
1	D	41	VAL
1	D	42	GLN
1	D	63	GLU
1	D	87	LYS
1	D	95	GLN
1	D	102	ARG
1	D	109	ILE
1	D	132	ILE
1	D	160	ASP
1	D	185	LEU
1	D	188	THR
1	D	195	LYS
1	D	227	LYS
1	D	232	LYS
1	D	235	LEU
1	D	243	ARG
1	D	253	ASN
1	G	4	LEU
1	G	9	LEU
1	G	10	VAL
1	G	28	LEU
1	G	39	LYS
1	G	40	ASP
1	G	42	GLN
1	G	53	ILE
1	G	57	SER
1	G	63	GLU
1	G	67	VAL
1	G	70	ARG
1	G	84	ILE
1	G	102	ARG
1	G	112	LEU
1	G	117	ASP
1	G	119	THR
1	G	125	LEU
1	G	132	ILE
1	G	134	THR
1	G	146	GLU
1	G	152	SER
1	G	168	ASP
1	G	185	LEU

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Mol	Chain	Res	Type
1	G	189	THR
1	G	223	LEU
1	G	227	LYS
1	G	229	LEU
1	G	233	LEU
1	G	235	LEU
1	G	238	LEU
1	G	242	SER
1	G	243	ARG
1	G	246	GLU
1	G	247	LYS
1	G	252	SER

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

Mol	Chain	Res	Type
1	A	95	GLN
1	A	211	ASN
1	D	42	GLN
1	D	93	ASN
1	D	95	GLN
1	D	157	ASN
1	D	211	ASN
1	D	218	ASN
1	D	230	GLN
1	G	75	ASN
1	G	157	ASN
1	G	217	GLN
1	G	230	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 6 ligands modelled in this entry, 6 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 (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

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	254/254 (100%)	0.33	7 (2%) 53 54	36, 49, 63, 70	0
1	D	254/254 (100%)	0.42	10 (3%) 39 38	53, 60, 66, 77	0
1	G	254/254 (100%)	0.38	11 (4%) 35 33	52, 60, 66, 73	0
2	B	31/31 (100%)	0.26	1 (3%) 47 48	53, 59, 77, 89	0
2	E	31/31 (100%)	0.32	2 (6%) 18 17	52, 61, 82, 86	0
2	H	31/31 (100%)	0.38	4 (12%) 3 2	49, 77, 118, 129	0
3	C	31/31 (100%)	0.09	2 (6%) 18 17	49, 59, 81, 87	0
3	F	31/31 (100%)	0.44	5 (16%) 1 1	50, 61, 80, 88	0
3	I	31/31 (100%)	0.38	2 (6%) 18 17	57, 72, 130, 135	0
All	All	948/948 (100%)	0.37	44 (4%) 32 31	36, 59, 75, 135	0

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	1	GLY	6.2
1	G	1	GLY	6.0
2	E	31	DA	4.2
1	D	2	SER	3.9
2	H	1	DG	3.8
2	B	31	DA	3.6
3	F	28	DC	3.3
1	A	150	CYS	2.8
1	A	1	GLY	2.8
1	G	195	LYS	2.8
3	F	29	DG	2.8
3	C	31	DT	2.7
1	G	2	SER	2.7
1	A	15	GLY	2.7
1	A	170	ALA	2.7

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Mol	Chain	Res	Type	RSRZ
3	F	31	DT	2.7
1	G	68	ALA	2.7
1	G	55	ILE	2.7
3	I	31	DT	2.6
1	D	113	GLU	2.6
2	E	1	DG	2.5
1	D	252	SER	2.5
3	F	27	DG	2.5
1	G	169	ILE	2.4
3	I	29	DG	2.3
3	C	29	DG	2.3
1	A	149	GLY	2.3
3	F	30	DC	2.3
1	D	63	GLU	2.3
1	D	45	TYR	2.2
1	G	150	CYS	2.2
2	H	3	DG	2.2
1	D	110	ILE	2.2
1	D	15	GLY	2.2
1	G	168	ASP	2.1
2	H	31	DA	2.1
1	D	111	TYR	2.1
1	A	155	LYS	2.1
1	D	149	GLY	2.1
1	G	54	GLY	2.1
1	A	2	SER	2.1
1	G	170	ALA	2.1
1	G	149	GLY	2.1
2	H	30	DC	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

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

6.3 Carbohydrates (i)

There are no monosaccharides 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. 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	B-factors(Å^2)	Q<0.9
4	CA	A	301	1/1	0.96	0.27	2,2,2,2	0
4	CA	G	305	1/1	0.97	0.26	3,3,3,3	0
4	CA	G	306	1/1	0.97	0.24	2,2,2,2	0
4	CA	D	304	1/1	0.98	0.22	2,2,2,2	0
4	CA	D	303	1/1	0.99	0.24	6,6,6,6	0
4	CA	A	302	1/1	0.99	0.22	2,2,2,2	0

6.5 Other polymers (i)

There are no such residues in this entry.