



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 11, 2024 – 09:19 PM EDT

PDB ID : 1VTL  
Title : CO-CRYSTAL STRUCTURE OF TBP RECOGNIZING THE MINOR GROOVE OF A TATA ELEMENT  
Authors : Kim, J.L.; Nikolov, D.B.; Burley, S.K.  
Deposited on : 1993-12-17  
Resolution : 2.25 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](mailto: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>.

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

MolProbity : 4.02b-467  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

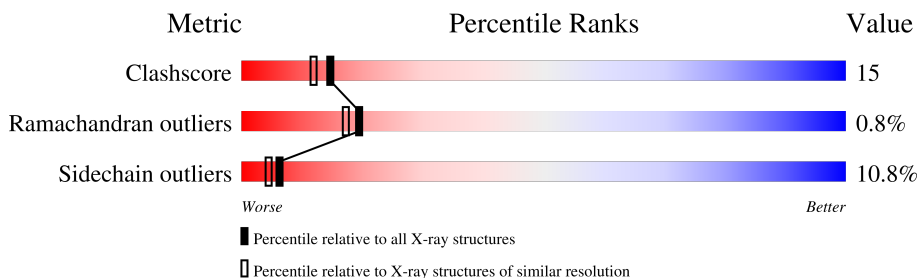
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.25 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))
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)

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  $\geq 3$ , 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  $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	14	29% 14% 43% 14%
1	C	14	14% 43% 43%
2	B	14	7% 29% 50% 14%
2	D	14	14% 50% 36%
3	E	186	63% 29% 6% .
3	F	186	75% 20% . .

## 2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 4832 atoms, of which 775 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 DNA chain called DNA (5'-D(\*GP\*CP\*TP\*AP\*TP\*AP\*AP\*AP\*AP\*GP\*GP\*GP\*CP\*A)-3').

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P			
1	A	14	Total 321	C 138	H 32	N 60	O 78	P 13	0	0	0
1	C	14	Total 321	C 138	H 32	N 60	O 78	P 13	0	0	0

- Molecule 2 is a DNA chain called DNA (5'-D(\*TP\*GP\*CP\*CP\*CP\*TP\*TP\*TP\*TP\*AP\*TP\*AP\*GP\*C)-3').

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P			
2	B	14	Total 305	C 136	H 26	N 44	O 86	P 13	0	0	0
2	D	14	Total 305	C 136	H 26	N 44	O 86	P 13	0	0	0

- Molecule 3 is a protein called TATA BINDING PROTEIN (TBP).

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
3	E	186	Total 1783	C 950	H 327	N 246	O 252	S 8	0	0	0
3	F	186	Total 1797	C 954	H 332	N 249	O 254	S 8	0	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. 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.

Note EDS was not executed.

- Molecule 1: DNA (5'-D(\*GP\*CP\*TP\*AP\*TP\*AP\*AP\*AP\*AP\*GP\*GP\*GP\*CP\*A)-3')

Chain A: 



- Molecule 1: DNA (5'-D(\*GP\*CP\*TP\*AP\*TP\*AP\*AP\*AP\*AP\*GP\*GP\*GP\*CP\*A)-3')

Chain C: 

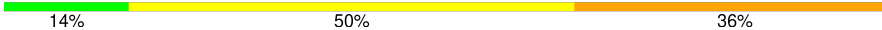


- Molecule 2: DNA (5'-D(\*TP\*GP\*CP\*CP\*CP\*TP\*TP\*TP\*TP\*AP\*TP\*AP\*GP\*C)-3')

Chain B: 



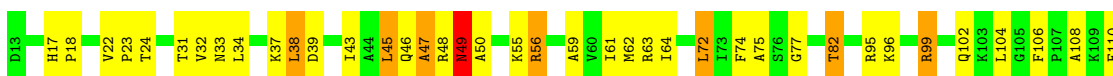
- Molecule 2: DNA (5'-D(\*TP\*GP\*CP\*CP\*CP\*TP\*TP\*TP\*TP\*AP\*TP\*AP\*GP\*C)-3')

Chain D: 



- Molecule 3: TATA BINDING PROTEIN (TBP)

Chain E: 





## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	41.80Å 146.50Å 57.60Å 90.00° 90.60° 90.00°	Depositor
Resolution (Å)	6.00 – 2.25	Depositor
% Data completeness (in resolution range)	(Not available) (6.00-2.25)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, $R_{free}$	0.202 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	4832	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	21.0	wwPDB-VP

## 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  >5	RMSZ	# Z  >5
1	A	1.49	1/326 (0.3%)	2.13	19/502 (3.8%)
1	C	1.43	0/326	1.99	16/502 (3.2%)
2	B	1.40	1/310 (0.3%)	2.42	22/476 (4.6%)
2	D	1.43	1/310 (0.3%)	2.32	24/476 (5.0%)
3	E	0.80	1/1486 (0.1%)	0.92	2/2002 (0.1%)
3	F	0.78	1/1495 (0.1%)	0.92	2/2013 (0.1%)
All	All	1.03	5/4253 (0.1%)	1.48	85/5971 (1.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	4
1	C	0	6
2	B	0	4
2	D	0	3
All	All	0	17

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	307	DT	C5-C7	7.12	1.54	1.50
3	E	122	CYS	CB-SG	-6.58	1.71	1.82
3	F	122	CYS	CB-SG	-6.13	1.71	1.82
1	A	210	DG	N9-C4	-5.32	1.33	1.38
2	D	509	DT	C5-C7	5.24	1.53	1.50

All (85) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	309	DT	O4'-C4'-C3'	-13.64	97.81	106.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	202	DC	O4'-C1'-N1	12.06	116.44	108.00
2	B	302	DG	O4'-C4'-C3'	-10.99	99.40	106.00
2	B	309	DT	C6-C5-C7	-10.82	116.41	122.90
1	C	407	DA	O4'-C4'-C3'	-9.19	100.49	106.00
2	D	506	DT	C6-C5-C7	-9.06	117.46	122.90
3	E	151	LEU	CA-CB-CG	9.04	136.10	115.30
1	A	213	DC	O4'-C1'-N1	9.01	114.31	108.00
2	B	307	DT	C6-C5-C7	-8.95	117.53	122.90
2	D	509	DT	O4'-C4'-C3'	-8.83	100.70	106.00
2	D	501	DT	C6-C5-C7	-8.61	117.73	122.90
2	B	313	DG	O4'-C1'-N9	8.54	113.98	108.00
1	A	203	DT	O4'-C1'-N1	8.06	113.64	108.00
2	D	507	DT	C6-C5-C7	-7.85	118.19	122.90
1	A	201	DG	O4'-C4'-C3'	-7.79	101.32	106.00
1	C	414	DA	O4'-C1'-N9	7.79	113.45	108.00
1	A	203	DT	N3-C2-O2	-7.78	117.63	122.30
3	F	151	LEU	CA-CB-CG	7.63	132.85	115.30
3	E	47	ALA	N-CA-C	7.62	131.58	111.00
2	D	509	DT	C6-C5-C7	-7.60	118.34	122.90
2	D	514	DC	O4'-C1'-C2'	-7.58	99.84	105.90
2	B	311	DT	C6-C5-C7	-7.58	118.35	122.90
1	A	205	DT	C6-C5-C7	-7.58	118.36	122.90
2	D	502	DG	O4'-C1'-N9	-7.32	102.88	108.00
2	B	311	DT	C4-C5-C6	7.13	122.28	118.00
1	C	403	DT	C6-C5-C7	-7.09	118.65	122.90
1	C	410	DG	C8-N9-C1'	6.88	135.95	127.00
2	D	501	DT	O4'-C1'-C2'	-6.86	100.41	105.90
1	C	410	DG	C4-N9-C1'	-6.86	117.59	126.50
2	D	502	DG	O4'-C4'-C3'	-6.81	101.78	104.50
1	A	201	DG	O4'-C1'-N9	6.62	112.64	108.00
1	C	405	DT	C6-C5-C7	-6.62	118.93	122.90
2	B	313	DG	P-O3'-C3'	6.62	127.65	119.70
2	B	311	DT	N3-C2-O2	-6.58	118.35	122.30
2	B	305	DC	O4'-C1'-C2'	-6.56	100.66	105.90
1	A	202	DC	C1'-O4'-C4'	-6.50	103.60	110.10
2	D	502	DG	O4'-C1'-C2'	-6.48	100.72	105.90
2	D	514	DC	P-O5'-C5'	-6.38	110.70	120.90
2	D	502	DG	C1'-O4'-C4'	-6.35	103.75	110.10
1	C	410	DG	N3-C4-N9	-6.33	122.20	126.00
2	B	308	DT	C4-C5-C6	6.26	121.76	118.00
2	D	504	DC	O4'-C1'-N1	6.21	112.35	108.00
2	B	308	DT	C6-C5-C7	-6.17	119.20	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	309	DT	C4-C5-C6	6.02	121.61	118.00
2	D	511	DT	O4'-C1'-N1	5.99	112.19	108.00
2	B	312	DA	O4'-C1'-C2'	-5.99	101.11	105.90
1	A	203	DT	C4-C5-C6	5.97	121.58	118.00
2	D	508	DT	C6-C5-C7	-5.93	119.34	122.90
1	A	210	DG	N3-C4-N9	-5.93	122.44	126.00
2	D	506	DT	C4-C5-C6	5.91	121.54	118.00
2	D	511	DT	C6-C5-C7	-5.86	119.38	122.90
2	D	501	DT	C4-C5-C6	5.86	121.52	118.00
1	A	205	DT	C4-C5-C6	5.84	121.50	118.00
2	D	511	DT	N3-C2-O2	-5.82	118.81	122.30
1	C	410	DG	O4'-C4'-C3'	-5.79	102.19	104.50
1	A	201	DG	P-O3'-C3'	5.75	126.60	119.70
2	D	510	DA	O4'-C1'-N9	5.73	112.01	108.00
1	A	207	DA	O4'-C4'-C3'	-5.72	102.21	104.50
1	A	210	DG	O4'-C4'-C3'	-5.71	102.21	104.50
1	C	413	DC	O4'-C1'-C2'	-5.71	101.33	105.90
1	A	205	DT	O4'-C4'-C3'	-5.67	102.23	104.50
1	C	410	DG	N9-C4-C5	5.61	107.64	105.40
2	D	511	DT	C4-C5-C6	5.47	121.28	118.00
1	A	206	DA	N1-C2-N3	-5.47	126.57	129.30
2	B	309	DT	O4'-C1'-C2'	-5.46	101.53	105.90
1	A	206	DA	O4'-C4'-C3'	-5.45	102.32	104.50
1	C	413	DC	O4'-C1'-N1	5.44	111.81	108.00
1	C	402	DC	P-O5'-C5'	-5.42	112.23	120.90
2	D	501	DT	N3-C2-O2	-5.38	119.07	122.30
2	B	301	DT	O4'-C1'-C2'	-5.34	101.62	105.90
2	D	504	DC	P-O3'-C3'	-5.33	113.30	119.70
1	A	203	DT	C6-C5-C7	-5.33	119.70	122.90
2	B	306	DT	C6-C5-C7	-5.27	119.74	122.90
1	C	403	DT	C4-C5-C6	5.26	121.15	118.00
2	B	309	DT	N3-C2-O2	-5.22	119.17	122.30
1	C	412	DG	O4'-C1'-C2'	-5.22	101.73	105.90
1	C	405	DT	C4-C5-C6	5.16	121.10	118.00
2	B	306	DT	C4-C5-C6	5.13	121.08	118.00
1	C	406	DA	O4'-C4'-C3'	-5.12	102.45	104.50
2	B	302	DG	C4'-C3'-C2'	-5.11	98.50	103.10
2	D	509	DT	C4-C5-C6	5.11	121.06	118.00
1	A	211	DG	P-O3'-C3'	5.07	125.78	119.70
2	B	304	DC	C4'-C3'-C2'	-5.06	98.55	103.10
3	F	48	ARG	NE-CZ-NH1	5.03	122.82	120.30
2	B	302	DG	P-O3'-C3'	-5.00	113.69	119.70

There are no chirality outliers.

All (17) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	201	DG	Sidechain
1	A	204	DA	Sidechain
1	A	210	DG	Sidechain
1	A	213	DC	Sidechain
2	B	302	DG	Sidechain
2	B	307	DT	Sidechain
2	B	311	DT	Sidechain
2	B	312	DA	Sidechain
1	C	401	DG	Sidechain
1	C	402	DC	Sidechain
1	C	405	DT	Sidechain
1	C	407	DA	Sidechain
1	C	408	DA	Sidechain
1	C	414	DA	Sidechain
2	D	503	DC	Sidechain
2	D	510	DA	Sidechain
2	D	511	DT	Sidechain

## 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	289	32	158	12	0
1	C	289	32	158	3	0
2	B	279	26	162	17	0
2	D	279	26	162	3	0
3	E	1456	327	1525	65	0
3	F	1465	332	1538	35	0
All	All	4057	775	3703	118	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 15.

All (118) 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:F:48:ARG:HH11	3:F:48:ARG:HG2	1.27	0.94
3:E:114:LYS:HE3	3:E:116:GLN:NE2	1.86	0.89
3:F:48:ARG:HD3	3:F:48:ARG:H	1.38	0.89
1:A:206:DA:N3	3:E:173:THR:HG21	1.89	0.88
2:B:306:DT:H5'	3:E:56:ARG:HD3	1.56	0.85
3:F:119:VAL:HG22	3:F:173:THR:HG23	1.60	0.83
3:E:38:LEU:HD22	3:E:77:GLY:HA2	1.60	0.81
1:C:406:DA:N3	3:F:173:THR:HG21	1.96	0.80
3:F:48:ARG:HD3	3:F:48:ARG:N	1.97	0.80
2:B:306:DT:H5'	3:E:56:ARG:CD	2.14	0.78
1:A:201:DG:H1	2:B:314:DC:H42	1.33	0.76
3:E:50:ALA:HB2	3:E:62:MET:HE2	1.68	0.74
3:E:119:VAL:HG22	3:E:173:THR:HG23	1.70	0.74
3:E:95:ARG:HG2	3:E:95:ARG:HH11	1.51	0.73
3:F:48:ARG:HG2	3:F:48:ARG:NH1	1.98	0.73
3:F:158:PRO:HD3	3:F:183:LYS:HD3	1.72	0.71
3:F:128:ILE:CD1	3:F:168:GLY:HA2	2.20	0.71
3:F:102:GLN:HG3	3:F:108:ALA:HB3	1.74	0.69
1:A:201:DG:H2'	1:A:202:DC:H6	1.58	0.68
1:A:201:DG:H2'	1:A:202:DC:C6	2.30	0.67
3:E:114:LYS:HE3	3:E:116:GLN:HE22	1.58	0.67
3:E:38:LEU:CD2	3:E:77:GLY:HA2	2.25	0.67
3:E:183:LYS:O	3:E:183:LYS:HE2	1.95	0.66
2:B:308:DT:OP1	3:E:63:ARG:NH1	2.29	0.66
3:F:33:ASN:HB3	3:F:111:LYS:HB2	1.77	0.66
3:E:128:ILE:CD1	3:E:168:GLY:HA2	2.26	0.65
3:F:119:VAL:HG22	3:F:173:THR:CG2	2.26	0.65
3:E:119:VAL:HG22	3:E:173:THR:CG2	2.26	0.65
2:B:308:DT:H4'	3:E:82:THR:HG23	1.80	0.63
3:F:198:ILE:H	3:F:198:ILE:HD13	1.61	0.63
2:B:311:DT:H5'	3:E:169:LYS:HG2	1.81	0.63
3:F:160:ILE:HG12	3:F:184:ALA:HB2	1.81	0.62
1:A:203:DT:C2'	1:A:204:DA:H5'	2.30	0.62
1:A:210:DG:H1	2:B:305:DC:H42	1.47	0.61
1:A:201:DG:H1	2:B:314:DC:N4	1.98	0.61
3:F:163:LEU:HB2	3:F:171:VAL:HB	1.82	0.61
2:B:308:DT:C4'	3:E:82:THR:HG23	2.31	0.61
2:B:305:DC:H2'	2:B:306:DT:H71	1.82	0.60
3:E:95:ARG:HG2	3:E:95:ARG:NH1	2.17	0.60
3:E:49:ASN:HD22	3:E:49:ASN:H	1.49	0.59
3:E:99:ARG:HH11	3:E:99:ARG:HB3	1.67	0.59
3:E:170:ILE:HD11	3:E:185:PHE:HD1	1.68	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:49:ASN:HD22	3:E:49:ASN:N	2.00	0.58
3:E:147:LEU:N	3:E:147:LEU:HD23	2.19	0.57
3:F:96:LYS:HD3	3:F:99:ARG:NH1	2.20	0.57
3:E:170:ILE:HD11	3:E:185:PHE:CD1	2.40	0.56
2:B:304:DC:H2'	2:B:305:DC:OP2	2.06	0.56
3:E:128:ILE:HD12	3:E:128:ILE:N	2.20	0.56
3:F:102:GLN:CG	3:F:108:ALA:HB3	2.35	0.56
3:E:17:HIS:CD2	3:E:22:VAL:HG22	2.42	0.54
3:F:23:PRO:HA	3:F:122:CYS:HB3	1.90	0.54
3:E:47:ALA:O	3:E:49:ASN:ND2	2.37	0.54
1:C:410:DG:O5'	1:C:410:DG:H2'	2.08	0.54
2:D:508:DT:OP1	3:F:63:ARG:NH1	2.41	0.54
3:E:128:ILE:HD11	3:E:168:GLY:HA2	1.90	0.53
3:E:144:GLU:OE1	3:E:147:LEU:HD12	2.08	0.53
3:E:49:ASN:H	3:E:49:ASN:ND2	2.06	0.52
3:E:59:ALA:HB2	3:E:74:PHE:CE2	2.45	0.52
3:E:146:GLU:C	3:E:147:LEU:HD23	2.31	0.52
3:E:47:ALA:O	3:E:49:ASN:N	2.43	0.52
1:A:210:DG:H1	2:B:305:DC:N4	2.07	0.52
3:E:134:ALA:HB2	3:E:151:LEU:CD2	2.41	0.51
3:E:135:TYR:HE2	3:F:198:ILE:HG21	1.76	0.51
3:F:128:ILE:HD12	3:F:168:GLY:HA2	1.93	0.51
3:E:152:ILE:N	3:E:152:ILE:HD13	2.25	0.50
2:D:503:DC:H2'	2:D:504:DC:C6	2.47	0.50
3:E:152:ILE:HD12	3:E:163:LEU:HD13	1.94	0.50
3:E:102:GLN:HA	3:E:106:PHE:O	2.11	0.50
3:E:144:GLU:HB3	3:E:147:LEU:HG	1.94	0.50
3:E:45:LEU:HD23	3:E:46:GLN:HG3	1.93	0.49
3:F:87:GLU:OE1	3:F:178:ARG:HD2	2.12	0.49
3:E:38:LEU:HD22	3:E:77:GLY:CA	2.37	0.49
2:B:305:DC:C2'	2:B:306:DT:H71	2.42	0.49
3:E:102:GLN:HG3	3:E:108:ALA:HB3	1.95	0.48
3:E:50:ALA:HB2	3:E:62:MET:CE	2.39	0.48
3:F:54:PRO:HA	3:F:57:PHE:O	2.13	0.48
3:E:143:TYR:HB2	3:E:151:LEU:HD22	1.95	0.48
1:A:203:DT:C5'	1:A:203:DT:H6	2.26	0.47
1:C:411:DG:O5'	1:C:411:DG:H2'	2.15	0.47
3:E:34:LEU:HD12	3:E:38:LEU:HD21	1.96	0.47
3:E:43:ILE:O	3:E:47:ALA:HB3	2.15	0.47
3:F:154:ARG:HG2	3:F:161:VAL:HG22	1.96	0.47
3:F:44:ALA:O	3:F:48:ARG:HA	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:306:DT:H5''	3:E:56:ARG:HD2	1.94	0.46
3:F:47:ALA:C	3:F:49:ASN:H	2.18	0.46
3:F:160:ILE:CD1	3:F:172:ILE:HG23	2.46	0.46
3:E:37:LYS:HD2	3:E:75:ALA:O	2.17	0.45
3:E:17:HIS:CG	3:E:22:VAL:HG22	2.52	0.45
1:A:204:DA:H2''	1:A:205:DT:O5'	2.15	0.45
3:E:64:ILE:HD12	3:E:96:LYS:HD2	1.99	0.45
3:E:32:VAL:HG22	3:E:33:ASN:N	2.32	0.45
3:E:39:ASP:O	3:E:43:ILE:HG13	2.16	0.44
3:E:99:ARG:HB3	3:E:99:ARG:NH1	2.30	0.44
3:F:71:ALA:HA	3:F:80:VAL:O	2.17	0.44
3:F:143:TYR:HB2	3:F:151:LEU:HD22	1.98	0.44
3:E:124:VAL:HG22	3:E:168:GLY:O	2.18	0.43
2:D:504:DC:H2''	2:D:505:DC:C6	2.52	0.43
3:E:23:PRO:HD2	3:E:182:TYR:CD1	2.53	0.43
3:F:96:LYS:O	3:F:99:ARG:HB3	2.18	0.43
2:B:303:DC:H2''	2:B:304:DC:C6	2.54	0.42
3:E:95:ARG:HG3	3:E:110:PHE:CZ	2.54	0.42
3:E:127:PRO:C	3:E:128:ILE:HD12	2.40	0.42
2:B:313:DG:H2'	2:B:314:DC:C6	2.54	0.42
3:F:52:TYR:CZ	3:F:54:PRO:HB3	2.54	0.42
1:A:201:DG:H2''	1:A:202:DC:H5'	2.02	0.42
2:B:312:DA:N3	3:E:149:PRO:CG	2.83	0.42
3:E:31:THR:HG23	3:E:116:GLN:HG3	2.02	0.42
3:E:61:ILE:HG12	3:E:72:LEU:HD12	2.02	0.42
3:E:55:LYS:O	3:E:55:LYS:HG2	2.20	0.41
3:E:129:ARG:HH11	3:E:129:ARG:HD3	1.74	0.41
3:F:37:LYS:HE2	3:F:76:SER:HA	2.03	0.41
3:F:47:ALA:O	3:F:49:ASN:N	2.54	0.41
1:A:206:DA:H5'	3:E:161:VAL:HG21	2.03	0.41
3:E:183:LYS:CE	3:E:183:LYS:HA	2.51	0.41
3:F:38:LEU:HD22	3:F:77:GLY:HA2	2.02	0.40
3:F:64:ILE:HD13	3:F:64:ILE:HG21	1.83	0.40
3:E:49:ASN:O	3:E:62:MET:HA	2.21	0.40
3:F:48:ARG:HH11	3:F:48:ARG:CG	2.14	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	
3	E	184/186 (99%)	174 (95%)	8 (4%)	2 (1%)	14	10
3	F	184/186 (99%)	174 (95%)	9 (5%)	1 (0%)	29	29
All	All	368/372 (99%)	348 (95%)	17 (5%)	3 (1%)	19	17

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	E	48	ARG
3	F	48	ARG
3	E	49	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	
3	E	156/159 (98%)	137 (88%)	19 (12%)	5	3
3	F	158/159 (99%)	143 (90%)	15 (10%)	8	6
All	All	314/318 (99%)	280 (89%)	34 (11%)	6	4

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	E	18	PRO
3	E	24	THR
3	E	38	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	E	45	LEU
3	E	49	ASN
3	E	56	ARG
3	E	72	LEU
3	E	82	THR
3	E	99	ARG
3	E	104	LEU
3	E	133	LEU
3	E	151	LEU
3	E	156	LYS
3	E	163	LEU
3	E	166	VAL
3	E	169	LYS
3	E	170	ILE
3	E	173	THR
3	E	183	LYS
3	F	24	THR
3	F	37	LYS
3	F	38	LEU
3	F	41	LYS
3	F	48	ARG
3	F	49	ASN
3	F	51	GLU
3	F	53	ASN
3	F	104	LEU
3	F	151	LEU
3	F	160	ILE
3	F	170	ILE
3	F	173	THR
3	F	178	ARG
3	F	198	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	E	17	HIS
3	E	49	ASN
3	E	116	GLN
3	F	137	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 monosaccharides 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.



## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.