



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 08:23 AM EDT

PDB ID : 1QNB  
Title : Crystal structure of the T(-25) Adenovirus major late promoter TATA box variant bound to wild-type TBP (Arabidopsis thaliana TBP isoform 2). TATA element recognition by the TATA box-binding protein has been conserved throughout evolution.  
Authors : Patikoglou, G.A.; Kim, J.L.; Sun, L.; Yang, S.-H.; Kodadek, T.; Burley, S.K.  
Deposited on : 1999-10-14  
Resolution : 2.23 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  
Xtriage (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

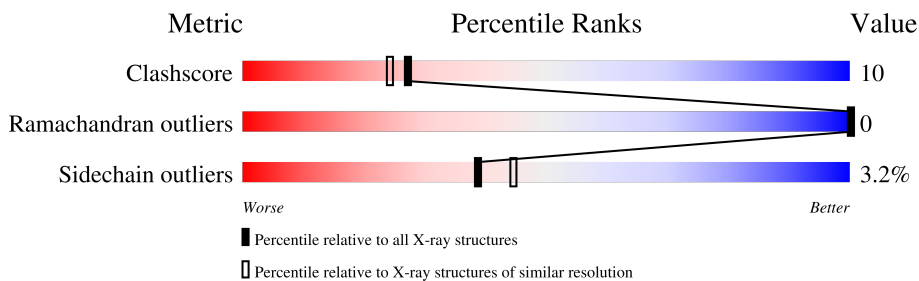
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.23 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	2539 (2.26-2.22)
Ramachandran outliers	138981	2489 (2.26-2.22)
Sidechain outliers	138945	2490 (2.26-2.22)

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	200	70% 20% 8%
1	B	200	75% 18% 6%
2	C	14	29% 57% 14%
2	E	14	29% 50% 21%
3	D	14	21% 57% 21%
3	F	14	29% 43% 29%

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 4390 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 TRANSCRIPTION INITIATION FACTOR TFIID-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	183	Total 1447	C 944	N 247	O 248	S 8	0	0	0
1	B	187	Total 1480	C 965	N 251	O 255	S 9	0	1	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	C	14	Total 286	C 137	N 57	O 79	P 13	0	0	0
2	E	14	Total 288	C 138	N 57	O 80	P 13	0	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	D	14	Total 280	C 136	N 47	O 84	P 13	0	0	0
3	F	14	Total 280	C 136	N 47	O 84	P 13	0	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	111	Total 111	O 111	0	0
4	B	123	Total 123	O 123	0	0
4	C	19	Total 19	O 19	0	0

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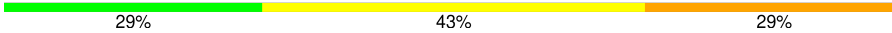
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
4	D	25	Total O 25 25	0	0
4	E	24	Total O 24 24	0	0
4	F	27	Total O 27 27	0	0



T215	G216	C217	C218	C219	A220	T221	T222	T223	A224	T225	A226	G227	C228
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- Molecule 3: DNA (5'-D(\*TP\*GP\*CP\*CP\*CP\*AP\*TP\*TP\*TP\*AP\*TP\*AP\*GP\*C)-3')

Chain F:  29% 43% 29%

T215	G216	C217	C218	C219	A220	T221	T222	T223	A224	T225	A226	G227	C228
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## 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 146.70Å 57.40Å 90.00° 90.50° 90.00°	Depositor
Resolution (Å)	6.00 – 2.23	Depositor
% Data completeness (in resolution range)	98.5 (6.00-2.23)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.07	Depositor
Refinement program	X-PLOR	Depositor
R, $R_{free}$	0.191 , 0.267	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	4390	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	32.0	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	0.46	0/1477	0.70	1/1987 (0.1%)
1	B	0.49	0/1514	0.71	0/2037
2	C	1.13	1/322 (0.3%)	1.66	8/496 (1.6%)
2	E	1.12	1/324 (0.3%)	1.72	11/499 (2.2%)
3	D	1.30	3/312 (1.0%)	1.95	12/479 (2.5%)
3	F	1.20	0/312	2.08	18/479 (3.8%)
All	All	0.76	5/4261 (0.1%)	1.21	50/5977 (0.8%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	222	DT	C5-C7	5.88	1.53	1.50
3	D	221	DT	C5-C7	5.84	1.53	1.50
3	D	215	DT	C5-C7	5.53	1.53	1.50
2	E	205	DT	C5-C7	5.37	1.53	1.50
2	C	205	DT	C5-C7	5.12	1.53	1.50

All (50) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	228	DC	O4'-C1'-N1	13.44	117.41	108.00
3	D	227	DG	O4'-C1'-N9	10.02	115.01	108.00
3	D	223	DT	O4'-C4'-C3'	-9.50	100.30	106.00
3	F	218	DC	O4'-C1'-N1	9.32	114.53	108.00
3	D	217	DC	C1'-O4'-C4'	-8.80	101.30	110.10
3	F	221	DT	C6-C5-C7	-8.05	118.07	122.90
3	D	217	DC	O4'-C4'-C3'	-8.04	101.17	106.00
3	F	221	DT	O4'-C4'-C3'	-7.54	101.47	106.00
3	F	222	DT	C6-C5-C7	-7.50	118.40	122.90
3	D	223	DT	C6-C5-C7	-7.48	118.41	122.90
2	C	213	DC	O4'-C1'-N1	7.45	113.21	108.00
3	F	225	DT	C6-C5-C7	-7.37	118.48	122.90
2	C	210	DG	O4'-C1'-N9	7.34	113.14	108.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	228	DC	C1'-O4'-C4'	-7.02	103.08	110.10
2	C	209	DT	C6-C5-C7	-6.91	118.75	122.90
2	E	202	DC	O4'-C1'-N1	6.89	112.82	108.00
2	C	205	DT	O4'-C4'-C3'	-6.86	101.76	104.50
2	E	209	DT	C6-C5-C7	-6.74	118.85	122.90
2	E	205	DT	C6-C5-C7	-6.67	118.90	122.90
2	E	213	DC	O4'-C1'-C2'	-6.57	100.64	105.90
2	E	213	DC	O4'-C1'-N1	6.50	112.55	108.00
3	D	222	DT	C6-C5-C7	-6.36	119.08	122.90
3	D	225	DT	C6-C5-C7	-6.31	119.12	122.90
3	D	227	DG	O4'-C1'-C2'	-6.28	100.87	105.90
3	D	221	DT	C6-C5-C7	-6.24	119.15	122.90
3	F	215	DT	C6-C5-C7	-6.24	119.15	122.90
2	C	205	DT	C6-C5-C7	-6.22	119.17	122.90
3	F	216	DG	O4'-C1'-N9	6.07	112.25	108.00
3	F	215	DT	O4'-C1'-N1	5.92	112.14	108.00
3	F	215	DT	P-O3'-C3'	5.82	126.68	119.70
2	C	203	DT	C6-C5-C7	-5.70	119.48	122.90
2	E	210	DG	O4'-C1'-C2'	-5.61	101.42	105.90
2	E	207	DA	O4'-C1'-N9	5.54	111.88	108.00
3	D	223	DT	C4-C5-C6	5.53	121.32	118.00
2	E	211	DG	O4'-C1'-N9	5.46	111.82	108.00
3	F	222	DT	C4-C5-C6	5.43	121.26	118.00
3	F	223	DT	C6-C5-C7	-5.43	119.64	122.90
3	F	228	DC	O4'-C1'-C2'	-5.42	101.56	105.90
3	F	225	DT	C4-C5-C6	5.34	121.20	118.00
3	F	221	DT	C1'-O4'-C4'	-5.22	104.88	110.10
3	D	216	DG	P-O3'-C3'	5.21	125.95	119.70
3	D	221	DT	C4-C5-C6	5.19	121.12	118.00
2	C	203	DT	C4-C5-C6	5.16	121.10	118.00
2	E	203	DT	C6-C5-C7	-5.16	119.80	122.90
2	C	209	DT	C4-C5-C6	5.13	121.08	118.00
2	E	205	DT	C4-C5-C6	5.06	121.04	118.00
2	E	209	DT	C4-C5-C6	5.05	121.03	118.00
3	F	221	DT	C4-C5-C6	5.05	121.03	118.00
3	F	215	DT	O4'-C1'-C2'	-5.01	101.89	105.90
1	A	133	LEU	CA-CB-CG	5.01	126.83	115.30

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1447	0	1529	29	2
1	B	1480	0	1563	33	7
2	C	286	0	155	7	2
2	E	288	0	159	9	0
3	D	280	0	161	5	2
3	F	280	0	161	6	0
4	A	111	0	0	6	0
4	B	123	0	0	11	0
4	C	19	0	0	1	0
4	D	25	0	0	1	1
4	E	24	0	0	4	0
4	F	27	0	0	1	0
All	All	4390	0	3728	79	7

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 10.

All (79) 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:B:46:GLN:O	4:B:2019:HOH:O	1.66	1.13
2:E:201:DG:C1'	4:E:2004:HOH:O	2.07	1.00
1:B:48:ARG:CB	4:B:2020:HOH:O	2.09	0.99
1:B:48:ARG:C	4:B:2020:HOH:O	2.05	0.94
1:B:48:ARG:NE	4:B:2022:HOH:O	2.01	0.93
1:B:48:ARG:HB3	4:B:2020:HOH:O	1.67	0.92
2:E:201:DG:H1'	4:E:2004:HOH:O	1.70	0.90
1:B:49:ASN:HA	4:B:2021:HOH:O	1.71	0.89
2:E:201:DG:N9	4:E:2004:HOH:O	2.06	0.89
1:B:127:PRO:HB2	1:B:197:LYS:HB2	1.67	0.75
1:B:67:PRO:HG2	1:B:93:ALA:HB2	1.70	0.74
3:F:215:DT:H1'	3:F:216:DG:H5'	1.70	0.73
1:A:56:ARG:HG2	3:D:220:DA:H5''	1.72	0.71
1:A:169:LYS:HD3	3:D:225:DT:H5''	1.76	0.68
1:A:198:ILE:HD11	1:B:190:PRO:HG2	1.76	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:PRO:HB2	1:A:197:LYS:HB3	1.78	0.65
1:A:59:ALA:HB2	1:A:74:PHE:CE2	2.34	0.63
1:B:41:LYS:O	1:B:45:LEU:HG	1.99	0.62
2:C:201:DG:H2'	2:C:202:DC:C6	2.36	0.61
1:A:16:LYS:HG3	1:A:17:HIS:CD2	2.35	0.60
2:C:210:DG:H2'	2:C:210:DG:N3	2.17	0.59
1:A:156:LYS:HA	1:A:156:LYS:HE2	1.85	0.58
1:A:41:LYS:HE3	1:A:41:LYS:HA	1.85	0.58
1:B:48:ARG:HG3	4:B:2020:HOH:O	2.04	0.58
2:E:201:DG:C4	4:E:2004:HOH:O	2.55	0.57
1:B:99:ARG:NE	1:B:103:LYS:HE3	2.24	0.53
1:B:48:ARG:CD	4:B:2022:HOH:O	2.51	0.53
1:A:97:TYR:O	1:A:101:VAL:HG23	2.09	0.52
1:A:189:TYR:HB3	1:A:190:PRO:HD3	1.92	0.52
1:A:46:GLN:NE2	4:A:2019:HOH:O	2.44	0.51
1:B:59:ALA:HB2	1:B:74:PHE:CE1	2.46	0.51
2:C:202:DC:H2'	2:C:203:DT:C6	2.46	0.50
3:F:227:DG:H5'	4:F:2022:HOH:O	2.11	0.50
1:B:48:ARG:CG	4:B:2020:HOH:O	2.47	0.50
1:B:102:GLN:HA	1:B:106:PHE:O	2.12	0.49
1:B:147:LEU:O	2:E:203:DT:H2''	2.13	0.48
1:A:156:LYS:HE2	1:A:156:LYS:CA	2.43	0.48
4:A:2096:HOH:O	3:D:225:DT:H5'	2.13	0.47
3:F:215:DT:H4'	3:F:216:DG:OP1	2.14	0.47
1:A:67:PRO:HD3	1:A:96:LYS:HE3	1.97	0.47
2:C:210:DG:N1	4:C:2013:HOH:O	2.35	0.47
1:B:97:TYR:HA	1:B:100:ILE:HD12	1.96	0.47
1:B:127:PRO:HA	1:B:166:VAL:O	2.15	0.46
1:B:99:ARG:HE	1:B:103:LYS:HE3	1.81	0.46
3:F:227:DG:H2''	3:F:228:DC:OP2	2.16	0.46
1:A:185:PHE:O	1:A:188:ILE:HG22	2.15	0.45
1:A:16:LYS:HG3	1:A:17:HIS:NE2	2.31	0.45
1:B:48:ARG:C	1:B:50:ALA:H	2.20	0.45
1:A:51:GLU:HG3	1:A:61:ILE:HB	1.99	0.45
1:A:196:ARG:NH2	1:B:190:PRO:HG3	2.32	0.45
1:B:95:ARG:NH2	4:B:2061:HOH:O	2.49	0.45
1:B:96:LYS:O	1:B:100:ILE:HG13	2.17	0.45
2:E:210:DG:H2''	2:E:211:DG:C8	2.52	0.45
1:B:71:ALA:HA	1:B:80:VAL:O	2.17	0.44
1:B:169:LYS:HD2	3:F:225:DT:H5''	1.99	0.44
1:A:102:GLN:HG3	1:A:108:ALA:HB3	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:133:LEU:HD12	1:B:137:HIS:CD2	2.52	0.44
2:C:210:DG:N7	3:D:219:DC:N3	2.65	0.44
1:A:40:LEU:HD22	1:A:60:VAL:HG23	1.98	0.43
1:A:169:LYS:HE3	4:D:2020:HOH:O	2.18	0.43
1:A:127:PRO:HA	1:A:166:VAL:O	2.18	0.43
2:E:214:DA:OP2	2:E:214:DA:H8	2.01	0.43
4:A:2097:HOH:O	2:C:207:DA:H5'	2.19	0.43
2:E:210:DG:H2'	2:E:210:DG:N3	2.33	0.43
4:A:2107:HOH:O	1:B:196:ARG:HD2	2.18	0.42
1:A:157:VAL:HA	1:A:158:PRO:HA	1.89	0.42
1:A:156:LYS:HE3	4:A:2085:HOH:O	2.18	0.42
1:A:55:LYS:HD3	1:A:55:LYS:HA	1.95	0.42
1:B:48:ARG:CA	4:B:2020:HOH:O	2.38	0.42
1:B:124:VAL:HG22	1:B:168:GLY:O	2.20	0.41
1:B:197:LYS:HB3	1:B:197:LYS:HE2	1.81	0.41
1:A:144:GLU:CB	1:A:147:LEU:HG	2.51	0.41
1:A:161:VAL:HG21	2:C:206:DA:H5'	2.01	0.41
1:A:126:PHE:HA	1:A:127:PRO:HD3	1.88	0.41
1:B:16:LYS:HB3	1:B:16:LYS:HE3	1.74	0.41
1:A:198:ILE:HD11	1:B:190:PRO:CG	2.48	0.41
2:E:210:DG:N7	3:F:219:DC:N3	2.69	0.40
3:D:228:DC:OP2	3:D:228:DC:H6	2.04	0.40
1:A:78:LYS:NZ	4:A:2040:HOH:O	2.55	0.40

All (7) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:65:ARG:NH2	2:C:211:DG:N7[2_656]	1.53	0.67
1:B:96:LYS:NZ	3:D:216:DG:OP1[2_656]	1.94	0.26
1:B:92[B]:MET:SD	4:D:2002:HOH:O[2_656]	2.03	0.17
1:A:174:GLY:O	1:B:48:ARG:NH2[2_646]	2.04	0.16
1:B:65:ARG:NH1	2:C:211:DG:O6[2_656]	2.04	0.16
1:B:96:LYS:NZ	3:D:215:DT:O3'[2_656]	2.13	0.07
1:A:159:LYS:CD	1:B:46:GLN:OE1[2_646]	2.19	0.01

## 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	181/200 (90%)	172 (95%)	9 (5%)	0	100	100
1	B	186/200 (93%)	177 (95%)	9 (5%)	0	100	100
All	All	367/400 (92%)	349 (95%)	18 (5%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	156/171 (91%)	150 (96%)	6 (4%)	33	36
1	B	161/171 (94%)	157 (98%)	4 (2%)	47	54
All	All	317/342 (93%)	307 (97%)	10 (3%)	39	44

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	LYS
1	A	53	ASN
1	A	86	SER
1	A	133	LEU
1	A	147	LEU
1	A	177	MET
1	B	38	LEU
1	B	48	ARG

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Mol	Chain	Res	Type
1	B	53	ASN
1	B	104	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.