Full wwPDB X-ray Structure Validation Report ⓘ

Sep 16, 2025 – 02:06 AM EDT

PDB ID	:	9NKE / pdb_00009nke
Title	:	Dpo4 DNA polymerase (R336A) in complex with DNA containing an 8oxoG template lesion
Authors	:	Pata, J.D.; Liang, B.
Deposited on	:	2025-02-28
Resolution	:	2.90 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:

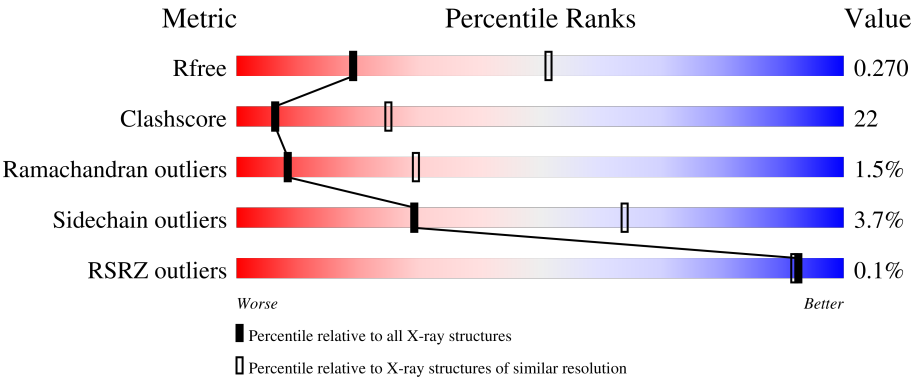
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

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 2.90 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}	164625	2335 (2.90-2.90)
Clashscore	180529	2564 (2.90-2.90)
Ramachandran outliers	177936	2514 (2.90-2.90)
Sidechain outliers	177891	2516 (2.90-2.90)
RSRZ outliers	164620	2337 (2.90-2.90)

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	352	53% 41%
1	B	352	55% 38%
2	P	14	43% 50% 7%
3	D	17	6% 24% 65% 6% 6%
3	T	17	47% 35% 12% 6%

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Mol	Chain	Length	Quality of chain
4	C	13	

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 13211 atoms, of which 6452 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 DNA polymerase IV.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	341	Total	C	H	N	O	S	0	0	0
			5618	1757	2881	469	504	7			
1	B	341	Total	C	H	N	O	S	0	0	0
			5618	1757	2881	469	504	7			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	336	ALA	ARG	engineered mutation	UNP Q97W02
B	336	ALA	ARG	engineered mutation	UNP Q97W02

- Molecule 2 is a DNA chain called Extended Primer Strand.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	P	14	Total	C	H	N	O	P	0	0	0
			446	137	158	58	80	13			

- Molecule 3 is a DNA chain called Template DNA.

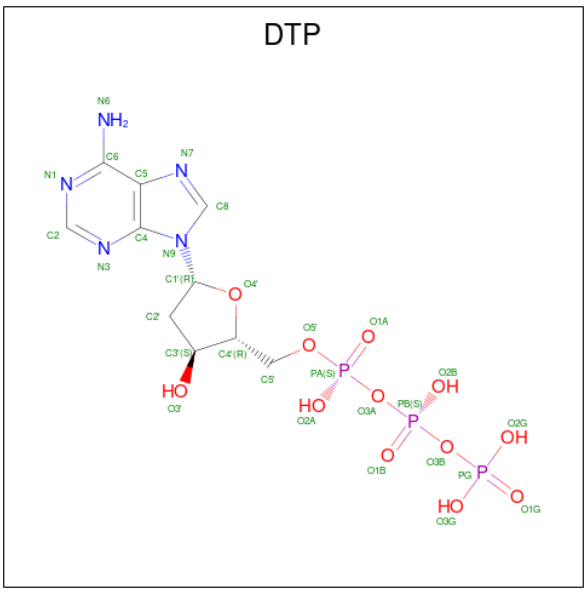
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
3	T	16	Total	C	H	N	O	P	0	0	0
			508	155	181	58	98	16			
3	D	16	Total	C	H	N	O	P	0	0	0
			508	155	181	58	98	16			

- Molecule 4 is a DNA chain called Primer Strand.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
4	C	13	Total	C	H	N	O	P	0	0	0
			414	127	147	53	75	12			

- Molecule 5 is 2'-DEOXYADENOSINE 5'-TRIPHOSPHATE (CCD ID: DTP) (formula: $C_{10}H_{16}N_5O_{12}P_3$)

(labeled as "Ligand of Interest" by depositor).

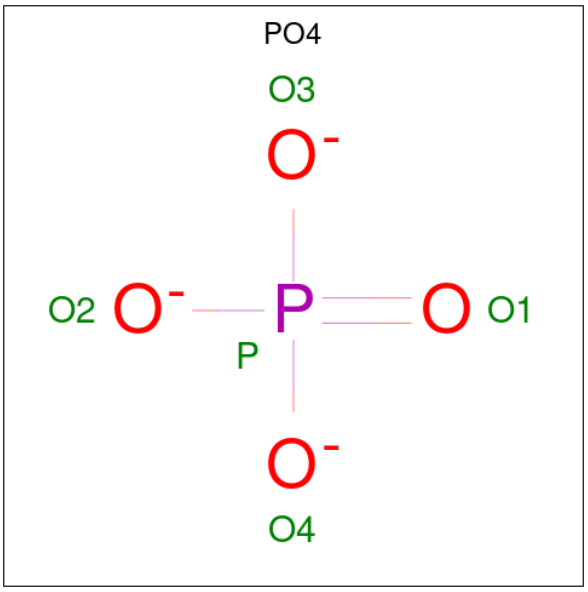


Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
5	A	1	Total	C	H	N	O	P	0	0
			41	10	11	5	12	3		
5	B	1	Total	C	H	N	O	P	0	0
			42	10	12	5	12	3		

- Molecule 6 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	Ca	0	0
			2	2		
6	B	1	Total	Ca	0	0
			1	1		

- Molecule 7 is PHOSPHATE ION (CCD ID: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total O P 5 4 1	0	0

- Molecule 8 is water.

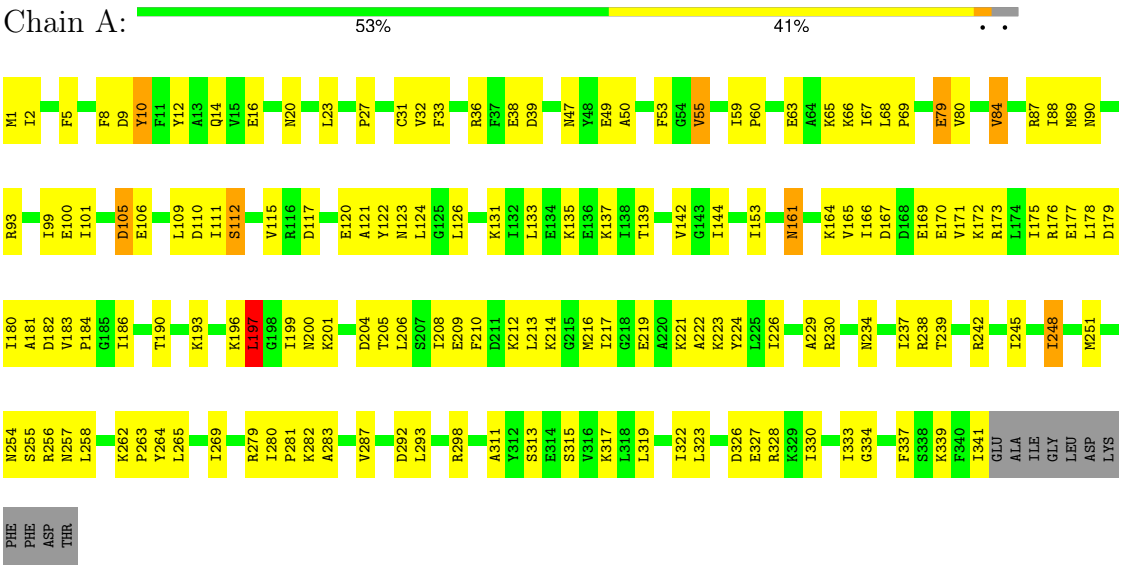
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	5	Total O 5 5	0	0
8	B	3	Total O 3 3	0	0

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.

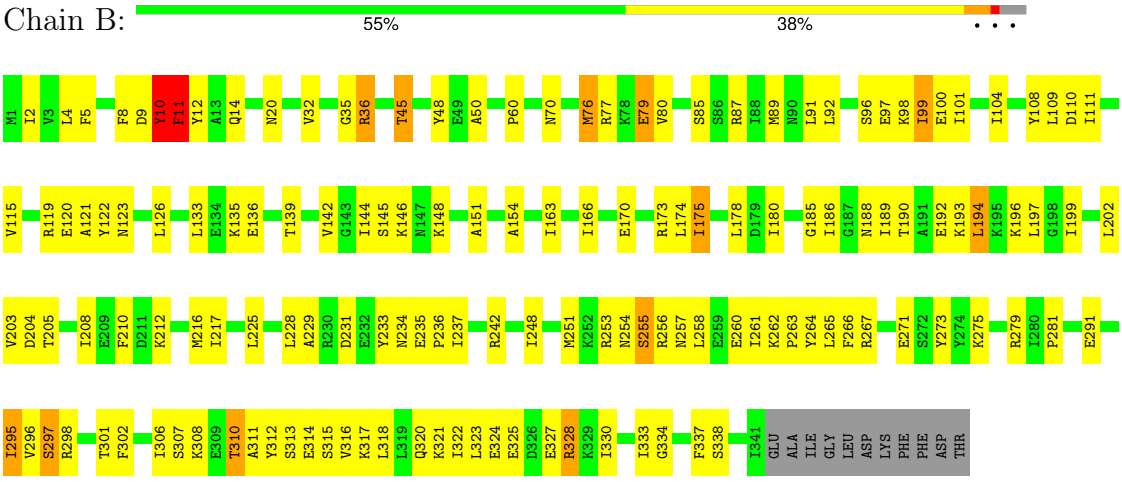
• Molecule 1: DNA polymerase IV

Chain A:



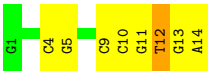
• Molecule 1: DNA polymerase IV

Chain B:



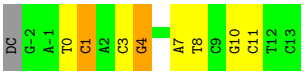
• Molecule 2: Extended Primer Strand

Chain P:



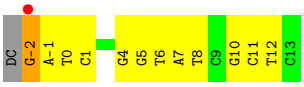
• Molecule 3: Template DNA

Chain T:



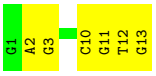
• Molecule 3: Template DNA

Chain D:



• Molecule 4: Primer Strand

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	99.31Å 103.58Å 105.84Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.67 – 2.90 24.67 – 2.90	Depositor EDS
% Data completeness (in resolution range)	96.8 (24.67-2.90) 91.9 (24.67-2.90)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.63 (at 2.89Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.198 , 0.273 0.199 , 0.270	Depositor DCC
R_{free} test set	2017 reflections (8.13%)	wwPDB-VP
Wilson B-factor (Å^2)	69.8	Xtriage
Anisotropy	0.301	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 49.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.008 for -h,l,k	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	13211	wwPDB-VP
Average B, all atoms (Å^2)	86.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 55.72 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.0369e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: DTP, CA, PO4, 8OG

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	0.68	0/2776	0.82	0/3729
1	B	0.65	1/2776 (0.0%)	0.80	1/3729 (0.0%)
2	P	1.00	0/324	1.17	1/499 (0.2%)
3	D	1.47	8/338 (2.4%)	0.89	0/516
3	T	1.00	0/338	1.10	1/516 (0.2%)
4	C	0.70	0/300	0.85	0/462
All	All	0.76	9/6852 (0.1%)	0.86	3/9451 (0.0%)

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	B	0	1

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	-2	DG	C6-O6	11.47	1.47	1.24
3	D	-2	DG	C8-N7	11.00	1.52	1.30
3	D	-2	DG	N9-C4	9.24	1.56	1.38
3	D	-2	DG	C2-N2	9.07	1.52	1.34
3	D	-2	DG	N7-C5	6.23	1.51	1.39
3	D	-2	DG	C1'-N9	-6.08	1.34	1.46
3	D	-2	DG	N9-C8	5.86	1.49	1.37
1	B	279	ARG	C-N	-5.74	1.27	1.33
3	D	-2	DG	C2-N3	5.04	1.43	1.33

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	P	12	DT	O4'-C1'-N1	5.71	116.96	108.40
1	B	11	PHE	N-CA-CB	5.37	119.56	110.49
3	T	1	DC	C5'-C4'-O4'	5.07	117.01	109.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	10	TYR	Peptide

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	2737	2881	2881	124	0
1	B	2737	2881	2881	135	0
2	P	288	158	158	6	0
3	D	327	181	181	11	0
3	T	327	181	181	7	0
4	C	267	147	147	8	0
5	A	30	11	12	3	0
5	B	30	12	12	3	0
6	A	2	0	0	0	0
6	B	1	0	0	0	0
7	A	5	0	0	1	0
8	A	5	0	0	2	0
8	B	3	0	0	0	0
All	All	6759	6452	6453	286	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 22.

All (286) 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)
5:B:401:DTP:O4'	5:B:401:DTP:C4'	1.64	1.18

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:197:LEU:HD11	1:B:212:LYS:HZ1	1.33	0.94
1:B:2:ILE:CG2	1:B:111:ILE:HD11	2.07	0.84
1:A:14:GLN:OE1	1:A:139:THR:HG22	1.81	0.80
1:A:139:THR:OG1	1:A:161:ASN:OD1	1.98	0.80
1:B:231:ASP:OD1	1:B:231:ASP:O	2.00	0.79
1:A:89:MET:HG3	1:A:101:ILE:HD13	1.63	0.78
1:B:32:VAL:HG22	1:B:76:MET:HE2	1.64	0.78
1:A:39:ASP:OD2	1:A:65:LYS:NZ	2.18	0.76
1:A:67:ILE:C	1:A:68:LEU:HD12	2.10	0.76
1:A:36:ARG:NH2	1:A:254:ASN:OD1	2.19	0.76
1:A:193:LYS:HG2	1:A:216:MET:HE3	1.69	0.75
1:B:2:ILE:HG22	1:B:111:ILE:HD11	1.68	0.75
1:A:122:TYR:CE1	1:A:126:LEU:HD21	2.23	0.73
2:P:12:DT:H2"	2:P:13:DG:O4'	1.89	0.73
1:B:313:SER:O	1:B:316:VAL:HG12	1.88	0.73
1:B:248:ILE:HA	1:B:334:GLY:HA3	1.72	0.72
1:B:311:ALA:O	1:B:315:SER:OG	2.06	0.71
1:A:222:ALA:O	1:A:226:ILE:HD13	1.91	0.71
1:A:292:ASP:OD2	1:A:328:ARG:NH1	2.23	0.71
1:B:197:LEU:HD11	1:B:212:LYS:NZ	2.05	0.70
1:A:171:VAL:O	1:A:175:ILE:HD12	1.90	0.70
1:A:63:GLU:OE2	1:A:66:LYS:NZ	2.21	0.70
1:B:253:ARG:NH1	1:B:260:GLU:OE2	2.25	0.70
1:A:67:ILE:O	1:A:68:LEU:HD12	1.91	0.69
1:B:96:SER:HB3	1:B:109:LEU:HD12	1.75	0.68
5:A:401:DTP:C8	2:P:13:DG:H2'	2.23	0.68
1:A:280:ILE:HB	1:A:341:ILE:HD12	1.76	0.67
1:A:67:ILE:HG22	1:A:68:LEU:CD1	2.25	0.67
1:A:209:GLU:OE1	1:A:209:GLU:HA	1.94	0.67
1:A:177:GLU:O	1:A:201:LYS:NZ	2.24	0.66
1:A:197:LEU:HD21	1:A:208:ILE:CD1	2.27	0.65
1:A:16:GLU:OE1	1:A:16:GLU:HA	1.96	0.65
1:A:213:LEU:HD22	1:A:217:ILE:HD11	1.77	0.64
1:B:265:LEU:HD11	1:B:315:SER:HB2	1.78	0.63
1:A:126:LEU:N	1:A:126:LEU:HD22	2.14	0.63
1:A:256:ARG:NH1	1:A:328:ARG:O	2.31	0.63
1:B:60:PRO:HD2	3:D:-2:DG:H21	1.61	0.63
1:A:67:ILE:HG22	1:A:68:LEU:HD12	1.80	0.63
1:A:166:ILE:HG22	1:A:171:VAL:HG23	1.80	0.63
3:D:10:DG:H2"	3:D:11:DC:H5'	1.80	0.62
1:B:99:ILE:HG13	1:B:109:LEU:HD13	1.81	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:258:LEU:HD13	1:B:258:LEU:C	2.24	0.62
1:A:20:ASN:O	1:A:23:LEU:HD13	1.99	0.61
1:B:2:ILE:HG21	1:B:111:ILE:HD11	1.80	0.61
1:B:115:VAL:HG12	1:B:120:GLU:HG2	1.81	0.61
1:A:9:ASP:O	1:A:10:TYR:C	2.42	0.61
1:B:308:LYS:HA	1:B:311:ALA:HB3	1.82	0.61
1:B:242:ARG:HD2	1:B:242:ARG:N	2.16	0.61
3:D:0:DT:H2"	3:D:1:DC:H5'	1.81	0.61
1:B:256:ARG:HD2	1:B:256:ARG:C	2.26	0.60
1:A:1:MET:O	1:A:2:ILE:HD12	2.01	0.60
1:A:265:LEU:O	1:A:269:ILE:HG13	2.03	0.59
1:B:12:TYR:HB2	1:B:45:THR:CG2	2.32	0.59
1:B:111:ILE:HD13	1:B:115:VAL:CG2	2.32	0.59
1:B:79:GLU:CD	1:B:79:GLU:H	2.08	0.59
1:B:122:TYR:O	1:B:126:LEU:HD12	2.02	0.59
1:B:119:ARG:HD3	1:B:119:ARG:O	2.03	0.59
1:A:171:VAL:O	1:A:175:ILE:CD1	2.51	0.59
1:A:175:ILE:HD12	1:A:175:ILE:H	1.67	0.58
1:A:193:LYS:HG2	1:A:216:MET:CE	2.32	0.58
4:C:10:DC:O2	3:D:5:DG:N2	2.36	0.58
1:B:242:ARG:HD2	1:B:242:ARG:H	1.68	0.58
1:B:4:LEU:HD12	1:B:144:ILE:CD1	2.34	0.58
1:B:199:ILE:HD11	1:B:208:ILE:HG13	1.86	0.58
1:B:210:PHE:CD1	1:B:210:PHE:C	2.81	0.58
1:A:206:LEU:HD21	1:A:230:ARG:HG2	1.87	0.57
1:A:59:ILE:C	1:A:59:ILE:HD12	2.30	0.57
1:B:170:GLU:OE1	1:B:173:ARG:HG2	2.05	0.57
1:B:180:ILE:HD11	1:B:225:LEU:CD1	2.35	0.57
1:A:115:VAL:HB	1:A:120:GLU:HB3	1.85	0.57
1:B:190:THR:OG1	4:C:12:DT:OP1	2.17	0.57
3:T:7:DA:H1'	3:T:8:DT:H5'	1.87	0.57
1:A:199:ILE:HG21	1:A:205:THR:HG22	1.87	0.56
1:A:283:ALA:HB2	1:A:339:LYS:HD2	1.88	0.56
1:A:326:ASP:OD1	1:A:326:ASP:C	2.49	0.56
1:B:111:ILE:C	1:B:111:ILE:HD12	2.31	0.56
1:A:326:ASP:OD1	1:A:327:GLU:N	2.39	0.56
1:B:4:LEU:HD12	1:B:144:ILE:HD11	1.86	0.56
1:B:295:ILE:N	1:B:295:ILE:HD12	2.19	0.56
1:A:20:ASN:O	1:A:23:LEU:CD1	2.54	0.55
1:B:298:ARG:HG2	1:B:322:ILE:HG12	1.88	0.55
1:B:321:LYS:NZ	1:B:321:LYS:HB3	2.21	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:401:DTP:O2A	2:P:13:DG:H5"	2.05	0.55
1:B:32:VAL:CG2	1:B:76:MET:HE2	2.36	0.55
1:A:144:ILE:HB	1:A:165:VAL:HG22	1.88	0.55
1:A:180:ILE:O	1:A:183:VAL:HG23	2.07	0.54
1:B:89:MET:HG3	1:B:101:ILE:HD13	1.88	0.54
1:A:50:ALA:O	1:A:55:VAL:CG1	2.55	0.54
1:B:85:SER:OG	1:B:104:ILE:O	2.20	0.54
1:B:98:LYS:HB2	1:B:110:ASP:HB3	1.89	0.54
1:B:32:VAL:HG22	1:B:76:MET:CE	2.35	0.54
1:B:257:ASN:O	1:B:261:ILE:HG12	2.07	0.54
1:A:133:LEU:HD12	1:A:137:LYS:HA	1.89	0.54
1:B:145:SER:OG	1:B:146:LYS:N	2.39	0.54
3:T:0:DT:H2"	3:T:1:DC:C5'	2.38	0.54
1:B:194:LEU:CD2	1:B:217:ILE:HG21	2.39	0.53
1:B:296:VAL:HG12	1:B:322:ILE:CD1	2.38	0.53
1:A:99:ILE:HG12	1:A:109:LEU:HD22	1.89	0.53
1:A:172:LYS:HA	1:A:175:ILE:CD1	2.39	0.53
1:B:60:PRO:CD	3:D:-2:DG:H21	2.22	0.52
1:A:258:LEU:CD1	1:A:319:LEU:HD23	2.39	0.52
1:A:178:LEU:HD12	1:A:179:ASP:H	1.75	0.52
1:A:292:ASP:OD1	1:A:292:ASP:O	2.28	0.52
1:A:298:ARG:HG2	1:A:322:ILE:HG13	1.91	0.52
1:A:313:SER:O	1:A:317:LYS:HG3	2.09	0.52
1:B:194:LEU:HD21	1:B:217:ILE:HG21	1.91	0.52
1:B:251:MET:HG2	1:B:264:TYR:CD2	2.45	0.52
1:A:323:LEU:HD21	1:A:330:ILE:HD11	1.92	0.52
1:B:185:GLY:O	1:B:186:ILE:HD13	2.10	0.52
1:B:180:ILE:HD11	1:B:225:LEU:HD13	1.92	0.51
1:A:122:TYR:CD1	1:A:122:TYR:C	2.88	0.51
1:A:287:VAL:O	1:A:333:ILE:HD12	2.10	0.51
1:A:311:ALA:O	1:A:315:SER:HB3	2.09	0.51
1:B:203:VAL:C	1:B:205:THR:H	2.19	0.51
1:A:193:LYS:HG2	1:A:216:MET:SD	2.51	0.51
1:B:314:GLU:O	1:B:318:LEU:HD13	2.10	0.51
1:B:202:LEU:HD11	1:B:228:LEU:HD23	1.93	0.51
1:B:203:VAL:O	1:B:205:THR:N	2.44	0.50
1:B:266:PHE:CE1	1:B:312:TYR:CG	3.00	0.50
1:A:59:ILE:HD12	1:A:60:PRO:O	2.12	0.50
1:A:213:LEU:HD22	1:A:217:ILE:CD1	2.41	0.50
1:A:213:LEU:HD12	1:A:226:ILE:HD11	1.91	0.50
1:A:53:PHE:CD1	1:A:53:PHE:N	2.80	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:123:ASN:HA	1:A:126:LEU:HD23	1.93	0.50
1:B:256:ARG:HB2	1:B:323:LEU:CD2	2.41	0.50
1:A:66:LYS:O	1:A:69:PRO:HD3	2.12	0.50
1:A:110:ASP:OD1	1:A:112:SER:OG	2.30	0.50
1:B:91:LEU:HD11	1:B:135:LYS:HB2	1.92	0.50
4:C:10:DC:H2"	4:C:11:DG:H8	1.76	0.50
1:A:89:MET:CG	1:A:101:ILE:HD13	2.39	0.49
3:D:7:DA:H2"	3:D:8:DT:OP2	2.12	0.49
1:A:178:LEU:HD11	1:A:182:ASP:HB2	1.95	0.49
4:C:2:DA:H2"	4:C:3:DG:C8	2.47	0.49
1:A:47:ASN:HB2	1:A:49:GLU:OE1	2.12	0.49
1:B:185:GLY:C	1:B:186:ILE:HD13	2.38	0.49
1:A:326:ASP:OD1	1:A:328:ARG:N	2.39	0.49
1:B:35:GLY:O	1:B:36:ARG:C	2.55	0.49
1:B:327:GLU:O	1:B:328:ARG:O	2.30	0.49
1:B:10:TYR:CE2	1:B:14:GLN:HB2	2.48	0.49
1:A:200:ASN:O	1:A:201:LYS:HD2	2.12	0.49
1:A:208:ILE:HD11	1:A:212:LYS:HB3	1.95	0.49
1:B:196:LYS:O	1:B:197:LEU:HD22	2.13	0.49
1:A:32:VAL:HG11	3:T:0:DT:H1'	1.94	0.49
1:B:251:MET:HG2	1:B:264:TYR:CE2	2.47	0.49
1:A:27:PRO:CB	1:A:50:ALA:HB2	2.44	0.48
1:A:292:ASP:O	1:A:293:LEU:HB2	2.14	0.48
1:B:4:LEU:HD12	1:B:144:ILE:HG12	1.96	0.48
1:B:123:ASN:HA	1:B:126:LEU:HD12	1.96	0.48
1:B:235:GLU:OE2	1:B:236:PRO:HD2	2.13	0.48
1:B:189:ILE:HD12	4:C:11:DG:H3'	1.96	0.47
1:B:262:LYS:HB2	1:B:263:PRO:HD2	1.96	0.47
1:B:301:THR:HG22	1:B:302:PHE:N	2.29	0.47
5:B:401:DTP:O2A	4:C:13:DG:O3'	2.26	0.47
1:A:173:ARG:HG2	1:A:173:ARG:HH11	1.78	0.47
1:B:115:VAL:CG1	1:B:120:GLU:HG2	2.43	0.47
1:A:5:PHE:O	1:A:142:VAL:HA	2.14	0.47
1:A:221:LYS:HA	1:A:224:TYR:HB3	1.96	0.47
1:A:2:ILE:HG22	1:A:111:ILE:CG1	2.44	0.47
1:A:178:LEU:HD12	1:A:179:ASP:N	2.29	0.47
1:B:5:PHE:CD1	1:B:108:TYR:CE1	3.03	0.47
1:A:38:GLU:HG3	1:A:39:ASP:OD1	2.15	0.47
1:A:167:ASP:OD2	1:A:169:GLU:OE2	2.33	0.47
1:A:193:LYS:HB3	1:A:216:MET:HG3	1.95	0.47
1:A:248:ILE:HA	1:A:334:GLY:HA3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:10:TYR:O	1:B:11:PHE:CB	2.61	0.47
1:B:234:ASN:OD1	1:B:234:ASN:O	2.32	0.47
3:T:0:DT:H2"	3:T:1:DC:O4'	2.15	0.47
1:B:307:SER:O	1:B:310:THR:N	2.48	0.47
5:B:401:DTP:O4'	5:B:401:DTP:C5'	2.55	0.47
1:A:254:ASN:O	1:A:255:SER:HB2	2.15	0.47
1:B:271:GLU:O	1:B:275:LYS:HG2	2.14	0.47
1:A:199:ILE:HG23	1:A:204:ASP:HB2	1.95	0.46
1:B:77:ARG:O	1:B:80:VAL:HG12	2.14	0.46
1:B:111:ILE:HD12	1:B:111:ILE:O	2.15	0.46
1:A:251:MET:HG2	1:A:264:TYR:CD2	2.51	0.46
1:B:121:ALA:HB1	1:B:144:ILE:HD13	1.97	0.46
1:A:209:GLU:OE1	1:A:209:GLU:CA	2.60	0.46
1:B:174:LEU:O	1:B:178:LEU:HB3	2.16	0.46
1:B:235:GLU:OE1	1:B:235:GLU:HA	2.15	0.46
1:A:8:PHE:N	1:A:8:PHE:CD1	2.84	0.46
1:B:297:SER:O	1:B:298:ARG:HD3	2.16	0.46
1:B:166:ILE:O	1:B:166:ILE:HG22	2.16	0.45
1:A:257:ASN:OD1	1:A:257:ASN:C	2.58	0.45
1:B:48:TYR:C	1:B:50:ALA:H	2.25	0.45
1:A:153:ILE:HD11	1:A:184:PRO:HD2	1.97	0.45
1:A:165:VAL:HG12	1:A:166:ILE:N	2.31	0.45
1:B:9:ASP:O	1:B:11:PHE:N	2.50	0.45
1:B:20:ASN:OD1	1:B:20:ASN:C	2.59	0.45
1:A:31:CYS:HB2	1:A:33:PHE:CE1	2.52	0.45
1:A:79:GLU:CD	1:A:79:GLU:H	2.23	0.45
1:A:80:VAL:O	1:A:84:VAL:HG13	2.16	0.45
1:B:10:TYR:CD2	1:B:14:GLN:HB2	2.52	0.45
1:B:301:THR:C	1:B:302:PHE:HD1	2.24	0.45
3:T:0:DT:C2'	3:T:1:DC:O4'	2.64	0.45
1:B:175:ILE:HG23	1:B:229:ALA:HA	1.99	0.45
1:B:228:LEU:HD12	1:B:233:TYR:CB	2.46	0.45
1:B:291:GLU:OE2	1:B:328:ARG:HD3	2.17	0.45
1:A:117:ASP:OD1	1:A:120:GLU:HB2	2.16	0.45
1:A:167:ASP:OD1	1:A:167:ASP:N	2.48	0.45
1:B:8:PHE:CD1	1:B:8:PHE:N	2.84	0.45
1:B:10:TYR:CE2	1:B:14:GLN:CB	2.99	0.45
1:B:100:GLU:OE1	1:B:148:LYS:NZ	2.42	0.45
1:A:12:TYR:CE2	5:A:401:DTP:H2'1	2.51	0.45
1:B:133:LEU:C	1:B:133:LEU:HD13	2.41	0.45
4:C:2:DA:H2"	4:C:3:DG:H8	1.82	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:GLU:HG3	1:A:238:ARG:O	2.17	0.45
1:A:219:GLU:O	1:A:223:LYS:HG3	2.16	0.45
1:B:10:TYR:O	1:B:11:PHE:HB3	2.16	0.45
1:B:237:ILE:HD12	1:B:237:ILE:N	2.31	0.45
1:B:266:PHE:CE1	1:B:312:TYR:CD1	3.05	0.45
3:D:-1:DA:N3	3:D:-1:DA:H2'	2.32	0.45
1:B:324:GLU:HB2	1:B:325:GLU:OE1	2.17	0.44
1:A:213:LEU:HD23	1:A:213:LEU:HA	1.78	0.44
1:B:263:PRO:O	1:B:267:ARG:HG3	2.17	0.44
1:B:142:VAL:O	1:B:163:ILE:HA	2.17	0.44
1:B:10:TYR:HE2	1:B:14:GLN:HA	1.83	0.44
1:A:197:LEU:CD2	1:A:208:ILE:CD1	2.96	0.44
3:D:5:DG:H2'	3:D:6:DT:C6	2.52	0.44
1:B:193:LYS:HD3	1:B:216:MET:O	2.18	0.43
1:B:262:LYS:O	1:B:266:PHE:HB2	2.18	0.43
1:A:175:ILE:HG21	1:A:229:ALA:HA	2.00	0.43
1:B:89:MET:HG3	1:B:101:ILE:CD1	2.49	0.43
1:A:122:TYR:O	1:A:126:LEU:CD2	2.66	0.43
1:B:97:GLU:OE1	1:B:97:GLU:O	2.36	0.43
1:A:170:GLU:OE1	1:A:173:ARG:NE	2.50	0.43
1:B:194:LEU:HD12	1:B:199:ILE:HG21	2.00	0.43
1:B:295:ILE:N	1:B:295:ILE:CD1	2.82	0.43
1:A:87:ARG:O	1:A:88:ILE:C	2.60	0.43
1:A:242:ARG:HE	1:A:279:ARG:HH22	1.67	0.43
1:A:90:ASN:OD1	1:A:93:ARG:NH1	2.51	0.43
1:A:245:ILE:HD11	1:A:279:ARG:HH21	1.84	0.42
1:A:176:ARG:O	1:A:201:LYS:HE2	2.19	0.42
1:B:4:LEU:HD12	1:B:144:ILE:CG1	2.49	0.42
1:B:87:ARG:NE	1:B:136:GLU:OE2	2.51	0.42
1:B:317:LYS:O	1:B:320:GLN:HB2	2.19	0.42
4:C:10:DC:C2	3:D:5:DG:N2	2.87	0.42
1:A:180:ILE:HD12	1:A:181:ALA:N	2.35	0.42
1:A:208:ILE:CG1	1:A:209:GLU:N	2.82	0.42
1:A:230:ARG:NE	8:A:501:HOH:O	2.42	0.42
1:A:105:ASP:OD1	1:A:106:GLU:HG3	2.19	0.42
1:A:238:ARG:HG3	1:A:238:ARG:HH11	1.84	0.42
1:A:210:PHE:CE2	1:A:214:LYS:HE3	2.55	0.42
1:B:70:ASN:OD1	1:B:70:ASN:O	2.38	0.42
1:B:321:LYS:HB3	1:B:321:LYS:HZ2	1.84	0.42
1:A:121:ALA:O	1:A:124:LEU:N	2.52	0.42
1:A:186:ILE:HG23	1:A:190:THR:HG22	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:295:ILE:HG22	1:B:296:VAL:N	2.35	0.42
2:P:4:DC:H2"	2:P:5:DG:C8	2.54	0.42
1:B:298:ARG:HG2	1:B:322:ILE:CG1	2.49	0.42
3:T:10:DG:H2"	3:T:11:DC:H5'	2.02	0.42
1:B:194:LEU:HD12	1:B:199:ILE:CG2	2.50	0.42
1:B:108:TYR:CD1	1:B:148:LYS:HG2	2.54	0.42
3:D:11:DC:H5'	3:D:11:DC:H6	1.85	0.42
3:D:11:DC:H2"	3:D:12:DT:O5'	2.19	0.42
1:A:282:LYS:HE2	1:A:339:LYS:O	2.20	0.41
1:B:145:SER:HB2	1:B:166:ILE:HB	2.02	0.41
1:B:256:ARG:HB2	1:B:323:LEU:HD21	2.02	0.41
1:A:126:LEU:N	1:A:126:LEU:CD2	2.81	0.41
1:B:295:ILE:C	1:B:296:VAL:CG2	2.93	0.41
1:A:281:PRO:HB3	1:A:337:PHE:HB3	2.01	0.41
3:T:3:DC:H2"	3:T:4:8OG:O8	2.20	0.41
1:B:242:ARG:N	1:B:242:ARG:CD	2.83	0.41
1:B:281:PRO:CB	1:B:337:PHE:HB3	2.49	0.41
1:A:176:ARG:O	1:A:201:LYS:CE	2.69	0.41
1:B:317:LYS:HA	1:B:317:LYS:HD2	1.89	0.41
2:P:11:DG:H1'	2:P:14:DA:N6	2.36	0.41
1:A:181:ALA:O	7:A:404:PO4:O3	2.39	0.41
1:B:151:ALA:O	1:B:154:ALA:HB3	2.21	0.41
1:B:188:ASN:C	1:B:190:THR:N	2.79	0.41
1:B:192:GLU:C	1:B:194:LEU:H	2.29	0.41
1:B:203:VAL:C	1:B:205:THR:N	2.79	0.41
1:B:333:ILE:HD12	1:B:334:GLY:N	2.35	0.41
1:B:273:TYR:OH	1:B:306:ILE:O	2.34	0.41
1:A:164:LYS:HE3	1:A:166:ILE:HD11	2.03	0.40
1:B:298:ARG:CG	1:B:322:ILE:HG12	2.51	0.40
1:B:330:ILE:CD1	1:B:330:ILE:N	2.84	0.40
1:B:330:ILE:N	1:B:330:ILE:HD12	2.36	0.40
1:A:262:LYS:N	1:A:263:PRO:CD	2.84	0.40
1:A:258:LEU:HD12	1:A:258:LEU:O	2.21	0.40
1:B:92:LEU:HA	1:B:92:LEU:HD23	1.91	0.40
2:P:9:DC:H2"	2:P:10:DC:H6	1.86	0.40
1:B:255:SER:OG	1:B:260:GLU:OE1	2.35	0.40
1:A:237:ILE:N	1:A:237:ILE:HD12	2.35	0.40
1:A:239:THR:HA	8:A:502:HOH:O	2.22	0.40
1:B:254:ASN:HA	1:B:330:ILE:O	2.21	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	339/352 (96%)	300 (88%)	34 (10%)	5 (2%)	8 29
1	B	339/352 (96%)	291 (86%)	43 (13%)	5 (2%)	8 29
All	All	678/704 (96%)	591 (87%)	77 (11%)	10 (2%)	8 29

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	234	ASN
1	B	10	TYR
1	B	11	PHE
1	B	36	ARG
1	B	328	ARG
1	A	10	TYR
1	A	161	ASN
1	A	197	LEU
1	B	204	ASP
1	A	196	LYS

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	299/308 (97%)	290 (97%)	9 (3%)	36 71
1	B	299/308 (97%)	286 (96%)	13 (4%)	25 57
All	All	598/616 (97%)	576 (96%)	22 (4%)	29 64

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	55	VAL
1	A	79	GLU
1	A	84	VAL
1	A	105	ASP
1	A	112	SER
1	A	131	LYS
1	A	135	LYS
1	A	197	LEU
1	A	248	ILE
1	B	10	TYR
1	B	45	THR
1	B	76	MET
1	B	79	GLU
1	B	99	ILE
1	B	139	THR
1	B	175	ILE
1	B	194	LEU
1	B	255	SER
1	B	295	ILE
1	B	297	SER
1	B	310	THR
1	B	338	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	123	ASN
1	A	130	ASN
1	B	130	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and

the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	8OG	T	4	3,2	22,25,26	4.77	18 (81%)	26,37,40	1.94	10 (38%)
3	8OG	D	4	3,4	22,25,26	4.87	18 (81%)	26,37,40	1.80	8 (30%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	8OG	T	4	3,2	-	0/7/21/22	0/3/3/3
3	8OG	D	4	3,4	-	0/7/21/22	0/3/3/3

All (36) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	T	4	8OG	C3'-C4'	-8.66	1.30	1.53
3	D	4	8OG	C3'-C4'	-8.34	1.31	1.53
3	T	4	8OG	C2'-C1'	-8.13	1.30	1.52
3	D	4	8OG	C8-N7	7.75	1.52	1.38
3	T	4	8OG	C8-N7	7.59	1.52	1.38
3	D	4	8OG	C2'-C1'	-7.21	1.32	1.52
3	D	4	8OG	C8-N9	5.93	1.51	1.40
3	D	4	8OG	O4'-C1'	5.88	1.55	1.42
3	T	4	8OG	C8-N9	5.83	1.51	1.40
3	D	4	8OG	C2-N2	5.80	1.47	1.34
3	D	4	8OG	C2-N3	5.79	1.47	1.33
3	D	4	8OG	O4'-C4'	5.79	1.57	1.45
3	T	4	8OG	C4-N3	5.63	1.47	1.34
3	D	4	8OG	C4-N3	5.62	1.47	1.34
3	T	4	8OG	O4'-C1'	5.56	1.54	1.42
3	T	4	8OG	C2-N2	5.23	1.46	1.34
3	T	4	8OG	C2-N1	5.08	1.50	1.37
3	T	4	8OG	O4'-C4'	5.07	1.56	1.45
3	T	4	8OG	C5-C4	4.99	1.44	1.37
3	T	4	8OG	C2-N3	4.70	1.44	1.33
3	D	4	8OG	C5-C4	4.67	1.43	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	4	8OG	C2-N1	4.44	1.48	1.37
3	D	4	8OG	C2'-C3'	4.37	1.64	1.52
3	D	4	8OG	C5-N7	4.31	1.44	1.37
3	T	4	8OG	C2'-C3'	4.29	1.63	1.52
3	D	4	8OG	C6-N1	3.98	1.46	1.38
3	D	4	8OG	C5-C6	3.52	1.52	1.41
3	T	4	8OG	O6-C6	-3.51	1.16	1.23
3	D	4	8OG	O6-C6	-3.44	1.17	1.23
3	T	4	8OG	C6-N1	3.40	1.45	1.38
3	T	4	8OG	C4-N9	3.36	1.45	1.39
3	T	4	8OG	C5-N7	3.33	1.43	1.37
3	D	4	8OG	C4-N9	3.20	1.45	1.39
3	T	4	8OG	C5-C6	2.34	1.48	1.41
3	T	4	8OG	O8-C8	-2.10	1.19	1.23
3	D	4	8OG	O8-C8	-2.01	1.19	1.23

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	4	8OG	C2-N3-C4	3.84	118.92	112.30
3	T	4	8OG	C5-N7-C8	-3.57	104.55	109.47
3	T	4	8OG	C6-C5-N7	-3.31	125.12	131.54
3	T	4	8OG	C2'-C3'-C4'	3.27	109.43	102.80
3	T	4	8OG	C4-C5-N7	3.26	112.03	106.06
3	T	4	8OG	O6-C6-C5	-3.20	119.55	127.26
3	D	4	8OG	C5-N7-C8	-3.12	105.17	109.47
3	D	4	8OG	O6-C6-C5	-3.10	119.78	127.26
3	T	4	8OG	O6-C6-N1	2.78	125.34	120.11
3	T	4	8OG	N2-C2-N3	-2.49	114.81	119.67
3	D	4	8OG	C4-C5-N7	2.47	110.59	106.06
3	D	4	8OG	N2-C2-N1	2.45	121.94	116.76
3	D	4	8OG	C2-N1-C6	-2.39	120.78	125.11
3	T	4	8OG	N2-C2-N1	2.33	121.69	116.76
3	D	4	8OG	C4'-O4'-C1'	-2.27	104.11	109.51
3	T	4	8OG	C2-N1-C6	-2.24	121.05	125.11
3	D	4	8OG	C5-C6-N1	2.17	118.08	112.13
3	T	4	8OG	C4'-O4'-C1'	-2.06	104.62	109.51

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	T	4	8OG	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 6 ligands modelled in this entry, 3 are monoatomic - leaving 3 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
5	DTP	B	401	6	28,32,32	3.79	11 (39%)	35,50,50	2.71	7 (20%)
7	PO4	A	404	-	4,4,4	0.56	0	6,6,6	0.84	0
5	DTP	A	401	6	28,32,32	2.92	8 (28%)	35,50,50	2.40	6 (17%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	DTP	B	401	6	-	5/18/34/34	0/3/3/3
5	DTP	A	401	6	-	2/18/34/34	0/3/3/3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	401	DTP	PA-O3A	8.90	1.69	1.59
5	B	401	DTP	O4'-C4'	8.76	1.64	1.45
5	B	401	DTP	PB-O3A	8.53	1.68	1.59
5	A	401	DTP	C3'-C4'	-8.41	1.30	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	401	DTP	C3'-C4'	-8.07	1.31	1.53
5	A	401	DTP	O4'-C4'	7.09	1.60	1.45
5	A	401	DTP	PA-O3A	5.33	1.65	1.59
5	B	401	DTP	PB-O3B	5.21	1.65	1.59
5	A	401	DTP	PB-O3A	4.45	1.64	1.59
5	B	401	DTP	O3'-C3'	4.33	1.52	1.43
5	B	401	DTP	O4'-C1'	-4.14	1.33	1.42
5	A	401	DTP	O3'-C3'	4.07	1.51	1.43
5	B	401	DTP	C6-N6	3.85	1.47	1.34
5	A	401	DTP	O4'-C1'	-3.63	1.34	1.42
5	A	401	DTP	C6-N6	3.21	1.45	1.34
5	A	401	DTP	C2-N3	2.85	1.36	1.32
5	B	401	DTP	C2-N3	2.60	1.36	1.32
5	B	401	DTP	PA-O5'	2.21	1.68	1.59
5	B	401	DTP	C2-N1	2.13	1.37	1.33

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	B	401	DTP	C5-C6-N6	10.47	136.25	120.31
5	A	401	DTP	C5-C6-N6	9.46	134.72	120.31
5	B	401	DTP	N3-C2-N1	-7.16	118.96	128.67
5	A	401	DTP	N6-C6-N1	-6.29	104.89	118.33
5	A	401	DTP	N3-C2-N1	-6.23	120.22	128.67
5	B	401	DTP	N6-C6-N1	-6.19	105.10	118.33
5	B	401	DTP	O4'-C1'-N9	-4.48	102.80	108.75
5	B	401	DTP	C2'-C1'-N9	2.95	121.45	114.61
5	A	401	DTP	O2A-PA-O5'	2.68	119.71	107.57
5	A	401	DTP	O3B-PB-O1B	2.28	117.57	110.70
5	A	401	DTP	O5'-C5'-C4'	2.11	116.19	108.99
5	B	401	DTP	C3'-C2'-C1'	2.05	107.62	102.60
5	B	401	DTP	O2B-PB-O3A	2.01	112.71	107.27

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	401	DTP	O4'-C4'-C5'-O5'
5	B	401	DTP	C3'-C4'-C5'-O5'
5	B	401	DTP	C5'-O5'-PA-O1A
5	A	401	DTP	PB-O3A-PA-O1A
5	A	401	DTP	PB-O3B-PG-O3G

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Mol	Chain	Res	Type	Atoms
5	B	401	DTP	PG-O3B-PB-O2B
5	B	401	DTP	C4'-C5'-O5'-PA

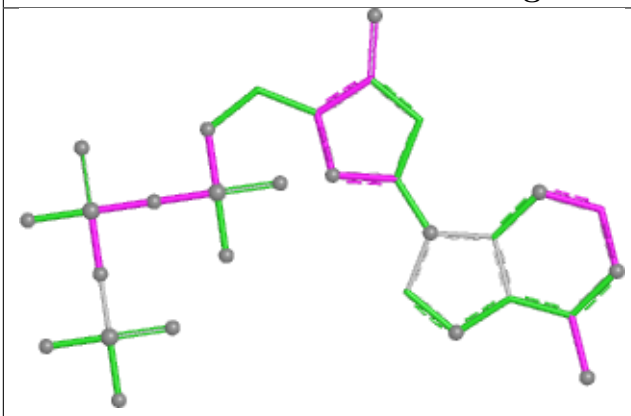
There are no ring outliers.

3 monomers are involved in 7 short contacts:

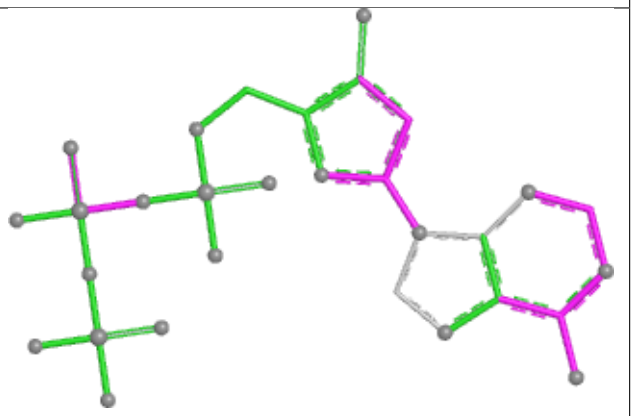
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	401	DTP	3	0
7	A	404	PO4	1	0
5	A	401	DTP	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

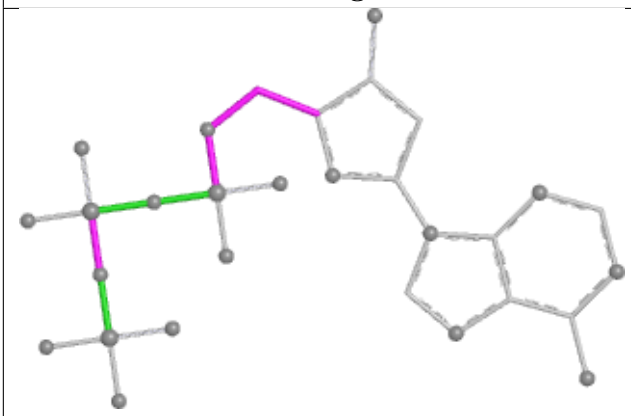
Ligand DTP B 401



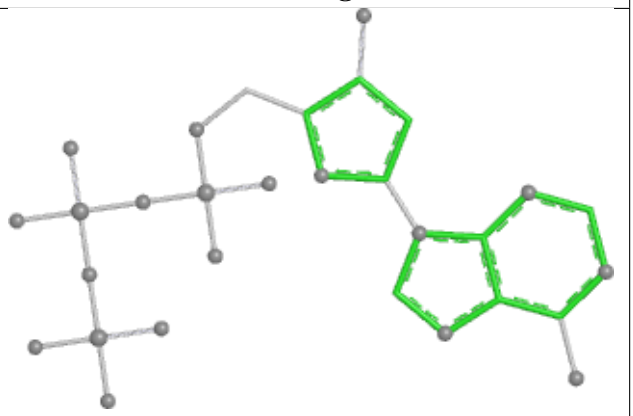
Bond lengths



Bond angles

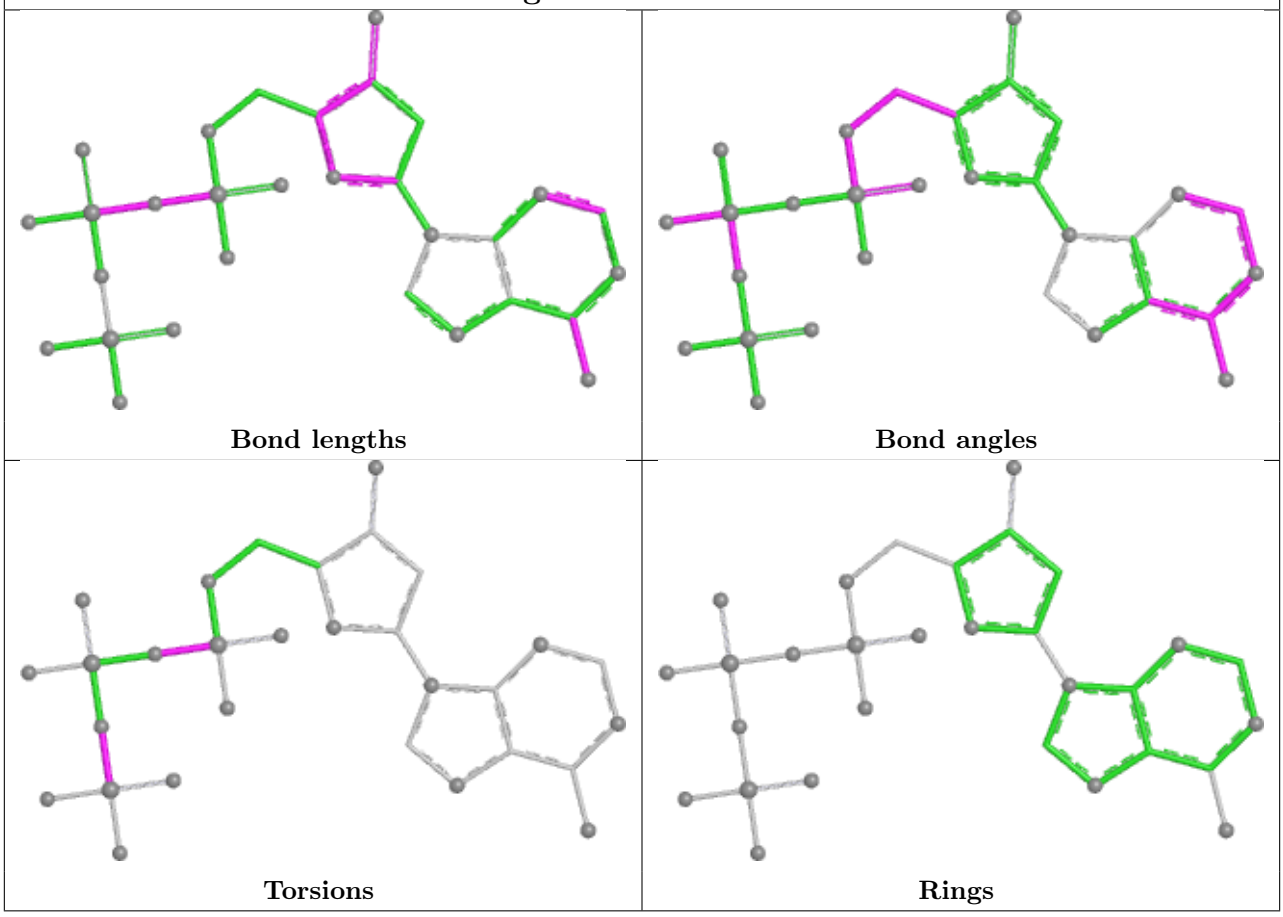


Torsions



Rings

Ligand DTP A 401



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	341/352 (96%)	-0.60	0 100 100	42, 76, 108, 136	0
1	B	341/352 (96%)	-0.40	0 100 100	48, 89, 128, 171	0
2	P	14/14 (100%)	-0.61	0 100 100	53, 68, 82, 88	0
3	D	15/17 (88%)	0.27	1 (6%) 25 21	85, 116, 132, 133	0
3	T	15/17 (88%)	-0.81	0 100 100	57, 70, 103, 118	0
4	C	13/13 (100%)	-0.35	0 100 100	66, 108, 120, 123	0
All	All	739/765 (96%)	-0.49	1 (0%) 92 92	42, 83, 124, 171	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	D	-2	DG	4.8

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

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
3	8OG	D	4	23/24	0.83	0.10	93,123,148,154	0
3	8OG	T	4	23/24	0.93	0.07	45,72,96,102	0

6.3 Carbohydrates

There are no oligosaccharides in this entry.

6.4 Ligands (i)

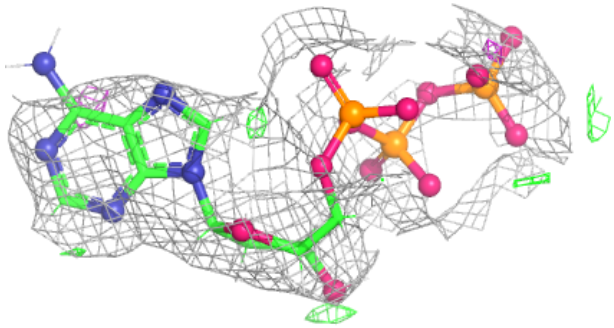
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

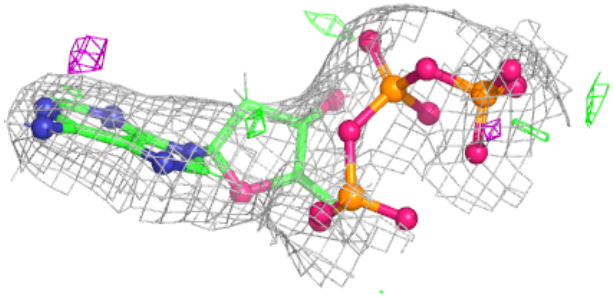
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	PO4	A	404	5/5	0.80	0.08	82,91,105,108	0
5	DTP	B	401	30/30	0.85	0.11	78,108,132,146	0
6	CA	B	402	1/1	0.91	0.07	112,112,112,112	0
6	CA	A	403	1/1	0.94	0.06	96,96,96,96	0
5	DTP	A	401	30/30	0.97	0.07	49,62,85,94	0
6	CA	A	402	1/1	0.99	0.04	64,64,64,64	0

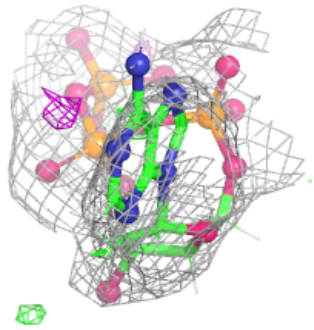
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around DTP B 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

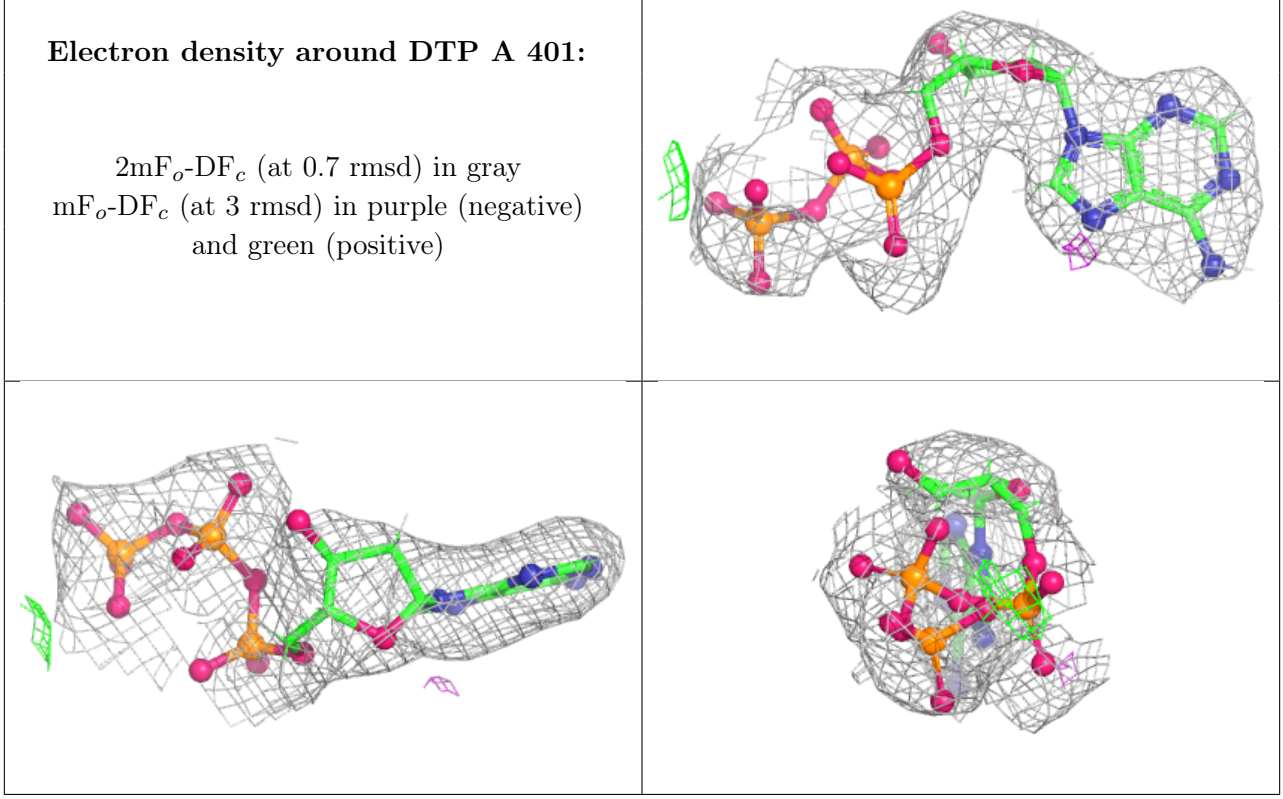






Electron density around DTP A 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers

There are no such residues in this entry.