



# Full wwPDB X-ray Structure Validation Report ⓘ

Jul 25, 2023 – 02:30 AM EDT

PDB ID : 8ICM  
Title : DNA POLYMERASE BETA (POL B) (E.C.2.7.7.7) COMPLEXED WITH SEVEN BASE PAIRS OF DNA; SOAKED IN THE PRESENCE OF DATP (1 MILLIMOLAR), MNCL<sub>2</sub> (5 MILLIMOLAR), AND AMMONIUM SULFATE (75 MILLIMOLAR)  
Authors : Pelletier, H.; Sawaya, M.R.  
Deposited on : 1996-01-04  
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](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  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.34  
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) : 2.34

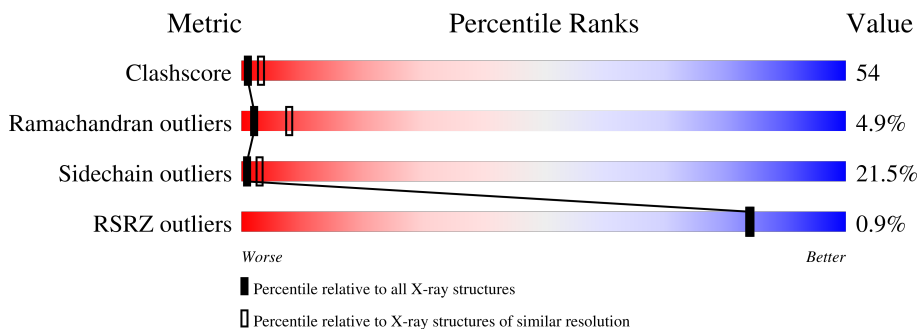
# 1 Overall quality at a glance

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))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (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  $\geq 3$ , 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  $\leq 5\%$ . 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	T	8	 12% 12% 88%
2	P	7	 14% 14% 86%
3	A	335	 26% 43% 25% . .

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 3057 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 DNA chain called DNA (5'-D(\*CP\*AP\*TP\*TP\*AP\*GP\*AP\*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	T	8	145	69	27	42	7	0	0	0

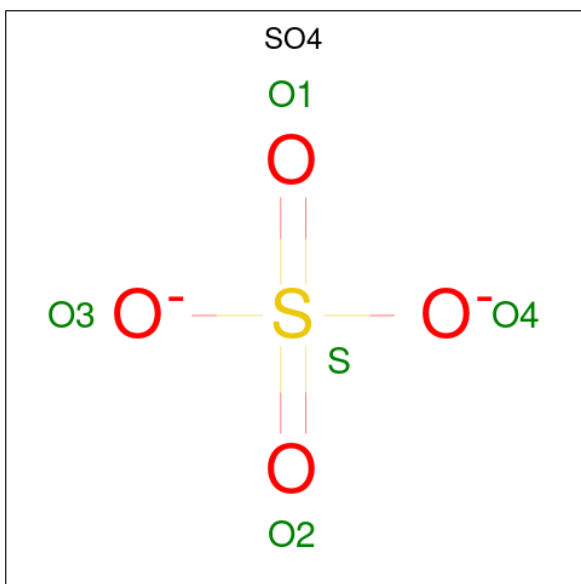
- Molecule 2 is a DNA chain called DNA (5'-D(\*TP\*CP\*TP\*AP\*AP\*TP\*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	P	7	144	69	24	44	7	0	0	0

- Molecule 3 is a protein called PROTEIN (DNA POLYMERASE BETA (E.C.2.7.7.7)).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	A	327	2623	1657	458	499	9	18	0	0

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



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

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	2	Total	Na	0	0
			2	2		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	T	14	Total	O	0	0
			14	14		
6	P	19	Total	O	0	0
			19	19		
6	A	105	Total	O	0	0
			105	105		

### 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.

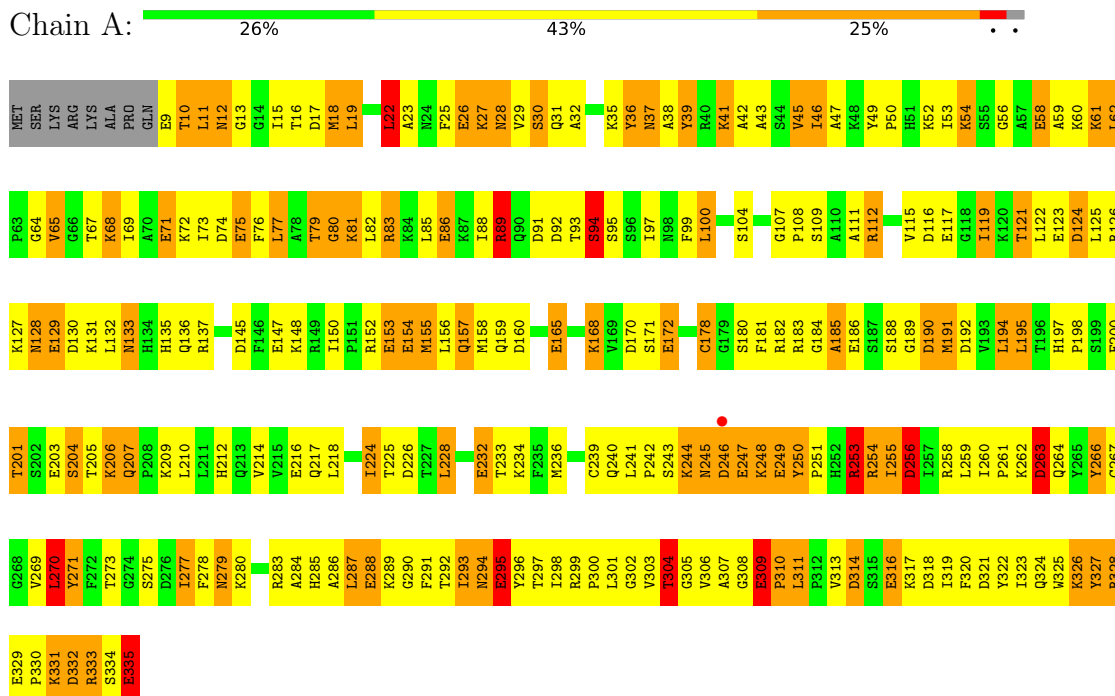
- Molecule 1: DNA (5'-D(\*CP\*AP\*TP\*TP\*AP\*GP\*AP\*A)-3')



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



- Molecule 3: PROTEIN (DNA POLYMERASE BETA (E.C.2.7.7.7))



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	178.81Å 57.78Å 48.52Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.90 11.77 – 2.70	Depositor EDS
% Data completeness (in resolution range)	94.0 (20.00-2.90) 90.4 (11.77-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.05	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.41 (at 2.70Å)	Xtrriage
Refinement program	TNT 5-D	Depositor
R, $R_{free}$	0.176 , (Not available) 0.167 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	36.0	Xtrriage
Anisotropy	0.255	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.14 , 96.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	3057	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	40.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.83% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  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: SO4, NA

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	T	2.39	11/162 (6.8%)	3.73	29/249 (11.6%)
2	P	2.81	14/160 (8.8%)	5.16	38/243 (15.6%)
3	A	1.25	28/2672 (1.0%)	1.82	65/3590 (1.8%)
All	All	1.46	53/2994 (1.8%)	2.31	132/4082 (3.2%)

All (53) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	P	3	DT	N1-C2	11.15	1.47	1.38
2	P	2	DC	C1'-N1	10.41	1.62	1.49
1	T	5	DA	N7-C5	-8.78	1.33	1.39
2	P	5	DA	C3'-O3'	-7.69	1.33	1.44
2	P	4	DA	N9-C4	-7.37	1.33	1.37
1	T	6	DG	C3'-O3'	-7.36	1.34	1.44
1	T	5	DA	N9-C4	-7.15	1.33	1.37
3	A	329	GLU	CD-OE2	7.03	1.33	1.25
3	A	147	GLU	CD-OE2	6.98	1.33	1.25
3	A	117	GLU	CD-OE2	6.80	1.33	1.25
2	P	3	DT	C2-N3	-6.71	1.32	1.37
3	A	129	GLU	CD-OE1	6.59	1.32	1.25
3	A	309	GLU	CD-OE2	6.56	1.32	1.25
3	A	249	GLU	CD-OE2	6.48	1.32	1.25
3	A	203	GLU	CD-OE1	6.42	1.32	1.25
3	A	316	GLU	CD-OE2	6.39	1.32	1.25
3	A	58	GLU	CD-OE1	6.37	1.32	1.25
3	A	86	GLU	CD-OE1	6.37	1.32	1.25
2	P	2	DC	C4-C5	6.30	1.48	1.43
1	T	3	DT	N1-C2	6.25	1.43	1.38
1	T	6	DG	N7-C5	-6.21	1.35	1.39
2	P	2	DC	N1-C2	6.19	1.46	1.40
3	A	71	GLU	CD-OE1	6.15	1.32	1.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	288	GLU	CD-OE2	6.12	1.32	1.25
2	P	7	DG	C3'-O3'	6.08	1.51	1.44
2	P	3	DT	N3-C4	-6.08	1.33	1.38
3	A	295	GLU	CD-OE2	6.03	1.32	1.25
2	P	7	DG	P-O5'	6.01	1.65	1.59
3	A	216	GLU	CD-OE2	5.99	1.32	1.25
1	T	5	DA	C3'-O3'	-5.95	1.36	1.44
3	A	26	GLU	CD-OE1	5.89	1.32	1.25
3	A	172	GLU	CD-OE2	5.83	1.32	1.25
3	A	123	GLU	CD-OE1	5.80	1.32	1.25
3	A	271	TYR	CB-CG	-5.76	1.43	1.51
3	A	326	LYS	CE-NZ	-5.76	1.34	1.49
1	T	5	DA	C5-C6	-5.75	1.35	1.41
3	A	75	GLU	CD-OE1	5.71	1.31	1.25
3	A	186	GLU	CD-OE1	5.71	1.31	1.25
1	T	5	DA	N1-C2	5.64	1.39	1.34
2	P	7	DG	C5'-C4'	5.60	1.57	1.51
3	A	153	GLU	CD-OE2	5.56	1.31	1.25
1	T	5	DA	C4'-O4'	-5.49	1.39	1.45
2	P	4	DA	C1'-N9	-5.46	1.39	1.47
1	T	5	DA	C6-N6	5.40	1.38	1.33
3	A	9	GLU	CD-OE2	5.35	1.31	1.25
3	A	247	GLU	CD-OE1	5.34	1.31	1.25
3	A	232	GLU	CD-OE2	5.33	1.31	1.25
3	A	335	GLU	CD-OE2	5.31	1.31	1.25
2	P	6	DT	C1'-N1	5.27	1.56	1.49
2	P	7	DG	O5'-C5'	5.23	1.55	1.42
3	A	165	GLU	CD-OE2	5.21	1.31	1.25
1	T	5	DA	O3'-P	-5.11	1.55	1.61
3	A	154	GLU	CD-OE2	5.03	1.31	1.25

All (132) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	P	1	DT	C6-N1-C1'	-27.14	79.70	120.40
2	P	1	DT	C2-N1-C1'	24.75	157.79	118.20
2	P	6	DT	C6-N1-C1'	-23.40	85.30	120.40
2	P	6	DT	C2-N1-C1'	22.27	153.83	118.20
1	T	6	DG	C8-N9-C1'	20.35	153.45	127.00
2	P	3	DT	C6-N1-C1'	-20.27	89.99	120.40
2	P	3	DT	C2-N1-C1'	19.12	148.79	118.20
1	T	6	DG	C4-N9-C1'	-19.00	101.80	126.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	T	4	DT	C6-N1-C1'	-17.26	94.51	120.40
2	P	7	DG	C8-N9-C1'	17.04	149.15	127.00
2	P	7	DG	C4-N9-C1'	-16.27	105.34	126.50
1	T	4	DT	C2-N1-C1'	15.89	143.62	118.20
2	P	3	DT	O4'-C1'-N1	15.11	118.58	108.00
2	P	2	DC	C2-N1-C1'	13.00	133.10	118.80
1	T	5	DA	N1-C6-N6	12.27	125.96	118.60
3	A	253	ARG	NE-CZ-NH1	12.17	126.38	120.30
2	P	3	DT	N3-C2-O2	-12.11	115.03	122.30
2	P	4	DA	C8-N9-C1'	-10.91	108.06	127.70
3	A	39	TYR	CB-CG-CD1	-10.63	114.62	121.00
2	P	3	DT	C1'-O4'-C4'	-10.46	99.64	110.10
3	A	253	ARG	NE-CZ-NH2	-10.32	115.14	120.30
3	A	258	ARG	NE-CZ-NH1	10.04	125.32	120.30
2	P	4	DA	C4-N9-C1'	9.49	143.38	126.30
2	P	1	DT	O4'-C1'-N1	9.46	114.62	108.00
2	P	4	DA	C1'-O4'-C4'	-9.45	100.65	110.10
3	A	130	ASP	CB-CG-OD2	-9.31	109.92	118.30
1	T	3	DT	C2-N1-C1'	9.21	132.94	118.20
2	P	2	DC	C6-N1-C1'	-8.98	110.03	120.80
1	T	3	DT	C6-N1-C1'	-8.85	107.13	120.40
3	A	256	ASP	CB-CG-OD1	8.72	126.15	118.30
3	A	256	ASP	CB-CG-OD2	-8.63	110.54	118.30
2	P	2	DC	C6-N1-C2	-8.58	116.87	120.30
2	P	3	DT	N3-C4-O4	-8.47	114.82	119.90
1	T	3	DT	N3-C2-O2	-8.45	117.23	122.30
2	P	3	DT	N1-C2-O2	8.39	129.81	123.10
2	P	5	DA	C4-N9-C1'	8.21	141.08	126.30
1	T	3	DT	O4'-C1'-N1	8.09	113.66	108.00
3	A	192	ASP	CB-CG-OD1	-8.04	111.06	118.30
3	A	314	ASP	CB-CG-OD1	-8.03	111.07	118.30
3	A	74	ASP	CB-CG-OD1	7.92	125.43	118.30
3	A	39	TYR	CB-CG-CD2	7.84	125.70	121.00
2	P	2	DC	P-O3'-C3'	7.83	129.10	119.70
1	T	5	DA	C5-C6-N1	-7.78	113.81	117.70
3	A	116	ASP	CB-CG-OD2	-7.76	111.32	118.30
3	A	124	ASP	CB-CG-OD2	-7.66	111.40	118.30
1	T	1	DC	P-O3'-C3'	7.62	128.85	119.70
1	T	5	DA	C2-N3-C4	-7.61	106.79	110.60
2	P	5	DA	C8-N9-C1'	-7.51	114.18	127.70
1	T	6	DG	P-O3'-C3'	7.44	128.63	119.70
1	T	5	DA	C6-C5-N7	-7.42	127.11	132.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	192	ASP	CB-CA-C	-7.29	95.81	110.40
3	A	254	ARG	NE-CZ-NH1	7.28	123.94	120.30
3	A	130	ASP	CB-CG-OD1	7.27	124.84	118.30
3	A	160	ASP	CB-CG-OD2	-7.23	111.79	118.30
2	P	2	DC	C4'-C3'-C2'	-7.14	96.67	103.10
3	A	157	GLN	N-CA-CB	7.09	123.36	110.60
3	A	91	ASP	CB-CG-OD1	-7.04	111.96	118.30
2	P	4	DA	C8-N9-C4	6.91	108.56	105.80
1	T	5	DA	O4'-C1'-N9	-6.88	103.19	108.00
3	A	258	ARG	NE-CZ-NH2	-6.83	116.88	120.30
3	A	335	GLU	N-CA-CB	6.81	122.86	110.60
1	T	5	DA	N9-C4-C5	-6.75	103.10	105.80
2	P	2	DC	N3-C2-O2	-6.73	117.19	121.90
3	A	224	ILE	CA-CB-CG1	-6.58	98.49	111.00
3	A	116	ASP	CB-CG-OD1	6.56	124.20	118.30
3	A	263	ASP	CB-CG-OD2	-6.45	112.50	118.30
3	A	271	TYR	CB-CG-CD1	-6.42	117.15	121.00
1	T	1	DC	C6-N1-C1'	-6.39	113.13	120.80
3	A	299	ARG	NE-CZ-NH1	6.38	123.49	120.30
3	A	17	ASP	CB-CA-C	6.37	123.15	110.40
3	A	83	ARG	N-CA-CB	6.26	121.86	110.60
2	P	2	DC	N1-C2-N3	6.24	123.57	119.20
3	A	246	ASP	CB-CG-OD1	-6.23	112.69	118.30
1	T	5	DA	C4-C5-N7	6.22	113.81	110.70
1	T	2	DA	C4-N9-C1'	-6.21	115.12	126.30
1	T	3	DT	N3-C4-O4	-6.18	116.19	119.90
1	T	4	DT	C1'-O4'-C4'	-6.15	103.95	110.10
1	T	6	DG	O4'-C4'-C3'	-6.14	102.05	104.50
3	A	266	TYR	CA-CB-CG	-6.13	101.75	113.40
3	A	328	ARG	NE-CZ-NH1	6.12	123.36	120.30
2	P	3	DT	C5-C6-N1	-6.12	120.03	123.70
2	P	2	DC	O4'-C1'-C2'	-6.10	101.02	105.90
1	T	4	DT	O4'-C1'-C2'	-6.08	101.04	105.90
3	A	145	ASP	CB-CG-OD2	-6.02	112.88	118.30
3	A	89	ARG	NE-CZ-NH1	5.95	123.27	120.30
3	A	318	ASP	CB-CG-OD2	-5.95	112.95	118.30
3	A	68	LYS	CB-CA-C	5.92	122.24	110.40
2	P	6	DT	O4'-C4'-C3'	-5.84	102.16	104.50
3	A	190	ASP	CB-CG-OD2	-5.83	113.06	118.30
3	A	160	ASP	CB-CG-OD1	5.80	123.52	118.30
3	A	333	ARG	NE-CZ-NH1	5.78	123.19	120.30
3	A	250	TYR	CB-CG-CD1	-5.72	117.57	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	246	ASP	CB-CG-OD2	5.71	123.44	118.30
3	A	246	ASP	CA-C-N	-5.69	104.68	117.20
1	T	7	DA	C8-N9-C4	5.68	108.07	105.80
3	A	271	TYR	CA-CB-CG	-5.63	102.70	113.40
3	A	326	LYS	CD-CE-NZ	5.63	124.64	111.70
3	A	271	TYR	N-CA-CB	-5.60	100.52	110.60
3	A	94	SER	CA-CB-OG	-5.60	96.09	111.20
1	T	3	DT	N1-C2-N3	5.58	117.95	114.60
1	T	1	DC	C2-N1-C1'	5.57	124.92	118.80
2	P	4	DA	O4'-C1'-N9	-5.56	104.11	108.00
3	A	74	ASP	CB-CG-OD2	-5.53	113.32	118.30
1	T	2	DA	C8-N9-C1'	5.51	137.61	127.70
3	A	12	ASN	CB-CA-C	5.51	121.41	110.40
3	A	109	SER	N-CA-CB	5.50	118.75	110.50
1	T	7	DA	P-O3'-C3'	-5.49	113.11	119.70
2	P	3	DT	C5'-C4'-O4'	5.48	119.72	109.30
3	A	314	ASP	CB-CG-OD2	5.47	123.23	118.30
3	A	190	ASP	CB-CG-OD1	5.45	123.20	118.30
3	A	155	MET	CA-CB-CG	-5.41	104.11	113.30
3	A	195	LEU	CB-CA-C	-5.37	99.99	110.20
2	P	2	DC	C4-C5-C6	5.33	120.06	117.40
3	A	178	CYS	CA-CB-SG	-5.33	104.42	114.00
2	P	3	DT	C5-C4-O4	5.31	128.62	124.90
3	A	22	LEU	CB-CG-CD1	-5.31	101.98	111.00
3	A	270	LEU	CA-C-N	-5.30	105.54	117.20
2	P	3	DT	N1-C1'-C2'	5.26	122.60	112.60
3	A	332	ASP	CB-CG-OD1	-5.25	113.57	118.30
2	P	1	DT	C6-C5-C7	-5.21	119.78	122.90
3	A	28	ASN	CA-CB-CG	-5.13	102.12	113.40
1	T	5	DA	N3-C4-C5	5.12	130.38	126.80
3	A	145	ASP	CB-CA-C	-5.12	100.16	110.40
3	A	304	THR	CA-CB-CG2	-5.09	105.28	112.40
3	A	91	ASP	CB-CG-OD2	5.04	122.84	118.30
3	A	249	GLU	CB-CA-C	5.04	120.48	110.40
3	A	124	ASP	CB-CG-OD1	5.04	122.83	118.30
2	P	6	DT	P-O5'-C5'	-5.04	112.84	120.90
3	A	250	TYR	CB-CG-CD2	5.04	124.02	121.00
3	A	112	ARG	NE-CZ-NH2	-5.03	117.79	120.30
3	A	333	ARG	NE-CZ-NH2	-5.02	117.79	120.30
2	P	5	DA	O4'-C1'-N9	5.01	111.51	108.00

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	T	145	0	80	7	0
2	P	144	0	80	16	0
3	A	2623	0	2641	280	0
4	A	5	0	0	1	0
5	A	2	0	0	0	0
6	A	105	0	0	16	0
6	P	19	0	0	2	0
6	T	14	0	0	1	0
All	All	3057	0	2801	300	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 54.

All (300) 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:A:293:ILE:HD13	3:A:298:ILE:HG13	1.32	1.10
3:A:29:VAL:HG21	3:A:94:SER:HB2	1.38	1.04
3:A:245:ASN:H	3:A:245:ASN:ND2	1.56	1.00
3:A:245:ASN:HD22	3:A:245:ASN:N	1.55	0.99
3:A:285:HIS:HD2	3:A:323:ILE:HD12	1.33	0.92
3:A:180:SER:HB3	3:A:183:ARG:HH21	1.37	0.90
3:A:18:MET:HE2	3:A:82:LEU:HD13	1.53	0.89
2:P:5:DA:H2''	2:P:6:DT:H5''	1.56	0.88
3:A:29:VAL:HG22	3:A:97:ILE:HD12	1.55	0.87
3:A:11:LEU:HD23	3:A:11:LEU:H	1.42	0.84
3:A:60:LYS:HA	3:A:65:VAL:HG23	1.56	0.84
2:P:6:DT:H2''	2:P:7:DG:H5''	1.58	0.83
3:A:330:PRO:HA	3:A:333:ARG:CG	2.11	0.81
3:A:31:GLN:HE21	3:A:112:ARG:HH12	1.28	0.81
3:A:31:GLN:NE2	3:A:112:ARG:HH12	1.79	0.80
3:A:286:ALA:HB2	3:A:323:ILE:HG21	1.60	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:254:ARG:NH1	3:A:255:ILE:H	1.79	0.80
2:P:5:DA:H2''	2:P:6:DT:C5'	2.13	0.79
3:A:286:ALA:CB	3:A:323:ILE:HG21	2.12	0.79
3:A:291:PHE:HD2	3:A:323:ILE:HG22	1.47	0.78
3:A:285:HIS:CD2	3:A:323:ILE:HD12	2.17	0.78
3:A:37:ASN:HB3	6:A:556:HOH:O	1.84	0.77
3:A:271:TYR:HB2	6:A:592:HOH:O	1.84	0.77
3:A:286:ALA:CB	3:A:293:ILE:HD11	2.14	0.77
3:A:18:MET:CE	3:A:82:LEU:HD13	2.16	0.75
3:A:183:ARG:HH11	3:A:275:SER:HA	1.51	0.75
3:A:119:ILE:CG2	3:A:124:ASP:HB3	2.16	0.75
2:P:3:DT:H1'	6:P:511:HOH:O	1.87	0.75
3:A:59:ALA:O	3:A:62:LEU:HB2	1.87	0.75
3:A:73:ILE:HG22	3:A:77:LEU:HD22	1.68	0.74
2:P:1:DT:H2''	2:P:2:DC:H5'	1.69	0.74
3:A:60:LYS:HA	3:A:65:VAL:CG2	2.17	0.74
3:A:259:LEU:O	3:A:260:ILE:HD13	1.88	0.73
3:A:183:ARG:NH1	3:A:275:SER:HA	2.04	0.73
3:A:291:PHE:CD2	3:A:323:ILE:HG22	2.24	0.73
3:A:234:LYS:HD3	6:A:617:HOH:O	1.89	0.72
3:A:172:GLU:HB3	3:A:197:HIS:NE2	2.05	0.72
3:A:212:HIS:HB3	6:A:541:HOH:O	1.88	0.72
3:A:31:GLN:HE21	3:A:112:ARG:NH1	1.88	0.71
3:A:330:PRO:HA	3:A:333:ARG:HG2	1.73	0.71
3:A:323:ILE:O	3:A:324:GLN:HG2	1.91	0.70
3:A:293:ILE:CD1	3:A:298:ILE:HG13	2.16	0.70
3:A:217:GLN:NE2	3:A:217:GLN:HA	2.06	0.70
3:A:254:ARG:NH1	3:A:255:ILE:N	2.39	0.69
3:A:35:LYS:O	3:A:38:ALA:HB3	1.93	0.68
3:A:58:GLU:O	3:A:61:LYS:HG3	1.94	0.68
3:A:330:PRO:HA	3:A:333:ARG:HG3	1.76	0.68
3:A:19:LEU:HB3	3:A:43:ALA:HB2	1.74	0.68
3:A:295:GLU:HA	6:A:592:HOH:O	1.93	0.67
3:A:49:TYR:CD1	3:A:50:PRO:HD2	2.29	0.67
3:A:16:THR:HG21	3:A:47:ALA:HB2	1.75	0.67
3:A:207:GLN:O	3:A:210:LEU:HB2	1.95	0.67
3:A:72:LYS:HG2	3:A:82:LEU:HD11	1.76	0.66
1:T:6:DG:H2'	1:T:7:DA:C8	2.31	0.66
3:A:292:THR:O	3:A:298:ILE:HA	1.95	0.66
3:A:181:PHE:HA	6:A:530:HOH:O	1.93	0.66
3:A:180:SER:HB2	3:A:185:ALA:HB2	1.76	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:326:LYS:O	3:A:328:ARG:HG2	1.96	0.66
3:A:27:LYS:HG3	3:A:28:ASN:ND2	2.12	0.65
3:A:254:ARG:HH11	3:A:255:ILE:H	1.42	0.65
2:P:5:DA:C2'	2:P:6:DT:H5''	2.27	0.65
3:A:29:VAL:HG21	3:A:94:SER:CB	2.23	0.65
3:A:92:ASP:HB2	6:A:647:HOH:O	1.97	0.65
3:A:319:ILE:O	3:A:322:TYR:HB2	1.96	0.65
3:A:79:THR:O	3:A:81:LYS:N	2.30	0.65
2:P:6:DT:C2'	2:P:7:DG:H5''	2.27	0.64
3:A:279:ASN:O	3:A:283:ARG:HG3	1.97	0.64
3:A:285:HIS:NE2	6:A:583:HOH:O	2.29	0.64
3:A:182:ARG:NH1	3:A:273:THR:OG1	2.29	0.64
3:A:12:ASN:HD21	3:A:53:ILE:H	1.46	0.63
3:A:327:TYR:HD1	3:A:328:ARG:N	1.97	0.63
3:A:300:PRO:HD3	3:A:311:LEU:HD22	1.82	0.62
3:A:188:SER:HB3	6:A:522:HOH:O	2.00	0.62
3:A:119:ILE:HG23	3:A:124:ASP:HB3	1.80	0.62
3:A:248:LYS:O	3:A:248:LYS:HG2	1.99	0.61
3:A:119:ILE:HG22	3:A:124:ASP:HB3	1.82	0.61
3:A:243:SER:HB3	3:A:249:GLU:HA	1.82	0.61
3:A:277:ILE:HG12	3:A:335:GLU:HA	1.80	0.61
3:A:41:LYS:HD3	3:A:42:ALA:N	2.15	0.61
3:A:270:LEU:HD13	3:A:316:GLU:OE2	2.01	0.61
3:A:165:GLU:HB3	3:A:217:GLN:HG3	1.83	0.60
3:A:83:ARG:O	3:A:86:GLU:N	2.34	0.60
3:A:41:LYS:NZ	3:A:64:GLY:O	2.30	0.59
3:A:291:PHE:CD1	3:A:300:PRO:HA	2.37	0.59
3:A:286:ALA:O	3:A:291:PHE:HB2	2.02	0.59
3:A:11:LEU:H	3:A:11:LEU:CD2	2.13	0.59
3:A:124:ASP:O	3:A:128:ASN:ND2	2.35	0.59
3:A:26:GLU:HG3	3:A:35:LYS:HB3	1.84	0.59
3:A:291:PHE:HD1	3:A:300:PRO:HA	1.67	0.59
3:A:178:CYS:SG	3:A:194:LEU:HD23	2.42	0.58
3:A:182:ARG:NH2	3:A:316:GLU:OE1	2.35	0.58
3:A:180:SER:HB3	3:A:183:ARG:NH2	2.12	0.58
3:A:253:ARG:HH11	3:A:253:ARG:CG	2.17	0.58
3:A:28:ASN:ND2	3:A:28:ASN:N	2.47	0.58
3:A:80:GLY:O	3:A:81:LYS:HG2	2.04	0.57
3:A:191:MET:HG2	3:A:255:ILE:HG13	1.86	0.57
3:A:278:PHE:CE2	3:A:333:ARG:HD2	2.39	0.57
3:A:302:GLY:N	3:A:307:ALA:HB3	2.19	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:323:ILE:C	3:A:324:GLN:HG2	2.25	0.57
3:A:152:ARG:NE	3:A:184:GLY:O	2.36	0.56
3:A:201:THR:HA	3:A:261:PRO:HB3	1.88	0.56
3:A:23:ALA:O	3:A:36:TYR:HD2	1.87	0.56
3:A:73:ILE:HG22	3:A:77:LEU:CD2	2.35	0.56
3:A:172:GLU:CG	3:A:198:PRO:HG2	2.36	0.56
3:A:260:ILE:HG22	3:A:261:PRO:N	2.20	0.56
3:A:200:PHE:CE2	3:A:261:PRO:HD3	2.41	0.55
3:A:23:ALA:HB2	3:A:39:TYR:HB3	1.88	0.55
3:A:172:GLU:HG2	3:A:198:PRO:HG2	1.89	0.55
3:A:311:LEU:HB3	3:A:322:TYR:CE2	2.41	0.55
3:A:180:SER:CB	3:A:183:ARG:HH21	2.13	0.55
3:A:302:GLY:HA3	3:A:307:ALA:HB2	1.88	0.54
3:A:309:GLU:H	3:A:310:PRO:HD3	1.72	0.54
3:A:326:LYS:O	3:A:326:LYS:HG3	2.05	0.54
3:A:32:ALA:O	3:A:36:TYR:HB3	2.08	0.54
3:A:150:ILE:HG12	3:A:253:ARG:HG2	1.89	0.54
3:A:82:LEU:HD23	3:A:85:LEU:HB2	1.89	0.54
3:A:259:LEU:HD12	3:A:260:ILE:H	1.73	0.54
3:A:18:MET:HE2	3:A:82:LEU:CD1	2.33	0.54
3:A:254:ARG:CZ	3:A:254:ARG:HB3	2.38	0.54
1:T:1:DC:H2"	1:T:2:DA:OP2	2.08	0.53
3:A:93:THR:HG22	3:A:94:SER:N	2.22	0.53
3:A:157:GLN:HG3	3:A:241:LEU:CD1	2.38	0.53
3:A:279:ASN:O	3:A:283:ARG:N	2.30	0.53
3:A:277:ILE:HG13	3:A:335:GLU:HB2	1.89	0.53
3:A:270:LEU:CD2	3:A:319:ILE:HG21	2.39	0.52
3:A:11:LEU:HD23	3:A:11:LEU:N	2.16	0.52
3:A:241:LEU:HB2	3:A:250:TYR:CD2	2.45	0.52
3:A:293:ILE:HD13	3:A:298:ILE:CG1	2.22	0.52
3:A:327:TYR:HE1	3:A:333:ARG:HH21	1.58	0.52
3:A:26:GLU:HB2	3:A:36:TYR:HB2	1.91	0.51
3:A:41:LYS:HD3	3:A:42:ALA:H	1.75	0.51
3:A:28:ASN:N	3:A:28:ASN:HD22	1.94	0.51
3:A:254:ARG:NH2	3:A:256:ASP:OD1	2.38	0.51
3:A:69:ILE:O	3:A:73:ILE:HG13	2.10	0.51
3:A:254:ARG:HH11	3:A:255:ILE:N	2.04	0.51
3:A:41:LYS:HE2	3:A:64:GLY:CA	2.39	0.51
3:A:286:ALA:HB1	3:A:293:ILE:HD11	1.91	0.51
2:P:5:DA:H5"	3:A:107:GLY:N	2.26	0.51
3:A:183:ARG:HH11	3:A:275:SER:CA	2.21	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:269:VAL:O	3:A:273:THR:OG1	2.27	0.51
3:A:303:VAL:C	3:A:305:GLY:H	2.13	0.51
3:A:245:ASN:H	3:A:245:ASN:HD22	0.75	0.51
3:A:204:SER:O	3:A:204:SER:OG	2.28	0.51
3:A:189:GLY:N	4:A:338:SO4:O3	2.29	0.50
3:A:154:GLU:C	3:A:158:MET:HE2	2.32	0.50
3:A:260:ILE:CG2	3:A:261:PRO:HD2	2.41	0.50
3:A:195:LEU:O	3:A:260:ILE:N	2.44	0.50
3:A:330:PRO:CA	3:A:333:ARG:HG2	2.42	0.50
3:A:31:GLN:HB2	3:A:112:ARG:NH1	2.27	0.50
3:A:294:ASN:HB2	3:A:295:GLU:OE1	2.12	0.50
3:A:302:GLY:H	3:A:307:ALA:HB3	1.75	0.50
1:T:5:DA:H1'	6:T:564:HOH:O	2.12	0.50
3:A:18:MET:HE2	3:A:82:LEU:HD22	1.94	0.50
2:P:5:DA:H2''	2:P:6:DT:H71	1.94	0.50
3:A:245:ASN:ND2	3:A:245:ASN:N	2.30	0.50
3:A:260:ILE:HG23	3:A:261:PRO:HD2	1.94	0.50
3:A:294:ASN:ND2	3:A:297:THR:H	2.10	0.50
3:A:330:PRO:O	3:A:333:ARG:HG2	2.11	0.50
3:A:197:HIS:CG	3:A:198:PRO:HD2	2.47	0.49
3:A:201:THR:HA	3:A:261:PRO:CB	2.42	0.49
3:A:277:ILE:HD11	3:A:334:SER:O	2.12	0.49
3:A:133:ASN:O	3:A:137:ARG:HG3	2.12	0.49
3:A:263:ASP:O	3:A:264:GLN:HG2	2.13	0.49
3:A:155:MET:CE	3:A:181:PHE:HB2	2.43	0.49
3:A:170:ASP:OD1	3:A:171:SER:N	2.46	0.49
3:A:310:PRO:HB3	6:A:626:HOH:O	2.11	0.49
2:P:6:DT:H2''	2:P:7:DG:C8	2.48	0.49
3:A:239:CYS:O	3:A:240:GLN:HB2	2.13	0.48
3:A:328:ARG:O	3:A:333:ARG:NE	2.28	0.48
3:A:111:ALA:O	3:A:115:VAL:HG23	2.13	0.48
3:A:148:LYS:HB3	6:A:620:HOH:O	2.13	0.48
3:A:277:ILE:HG13	3:A:335:GLU:CB	2.44	0.48
1:T:6:DG:C2'	1:T:7:DA:C8	2.96	0.48
3:A:119:ILE:HG22	3:A:124:ASP:CB	2.43	0.48
3:A:286:ALA:HB1	3:A:291:PHE:HB2	1.95	0.48
3:A:150:ILE:N	3:A:188:SER:O	2.32	0.47
2:P:5:DA:P	3:A:107:GLY:HA3	2.54	0.47
3:A:182:ARG:HG2	3:A:273:THR:CG2	2.44	0.47
3:A:217:GLN:HA	3:A:217:GLN:HE21	1.77	0.47
3:A:317:LYS:HE3	3:A:321:ASP:OD1	2.13	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:83:ARG:HA	3:A:86:GLU:HG2	1.96	0.47
3:A:88:ILE:HG22	3:A:89:ARG:N	2.25	0.47
3:A:121:THR:O	3:A:124:ASP:HB2	2.15	0.47
3:A:155:MET:HE3	3:A:181:PHE:HB2	1.97	0.47
3:A:311:LEU:HB3	3:A:322:TYR:HE2	1.79	0.47
3:A:212:HIS:N	3:A:212:HIS:CD2	2.79	0.47
3:A:15:ILE:HD11	3:A:77:LEU:HD11	1.96	0.47
3:A:100:LEU:HD12	3:A:100:LEU:HA	1.59	0.46
3:A:308:GLY:O	3:A:309:GLU:HB2	2.16	0.46
3:A:197:HIS:CD2	3:A:198:PRO:HD2	2.49	0.46
3:A:278:PHE:HB2	3:A:333:ARG:O	2.15	0.46
3:A:159:GLN:O	3:A:159:GLN:HG2	2.09	0.46
3:A:195:LEU:O	3:A:259:LEU:HD12	2.16	0.46
3:A:207:GLN:HB2	6:A:625:HOH:O	2.15	0.46
2:P:5:DA:H2'	2:P:6:DT:H5'	1.93	0.46
3:A:25:PHE:CE2	3:A:88:ILE:HG12	2.51	0.46
3:A:157:GLN:HG3	3:A:241:LEU:HD11	1.96	0.46
3:A:295:GLU:H	3:A:295:GLU:CD	2.17	0.46
3:A:15:ILE:HG21	3:A:46:ILE:HD13	1.97	0.46
3:A:182:ARG:NH1	3:A:273:THR:CG2	2.79	0.46
3:A:327:TYR:CD1	3:A:328:ARG:N	2.82	0.46
3:A:127:LYS:HB2	3:A:128:ASN:ND2	2.31	0.45
3:A:182:ARG:HH11	3:A:273:THR:CG2	2.30	0.45
2:P:5:DA:C2'	2:P:6:DT:H71	2.45	0.45
3:A:18:MET:HE1	3:A:76:PHE:HB3	1.97	0.45
3:A:108:PRO:O	3:A:112:ARG:HG3	2.16	0.45
3:A:200:PHE:O	3:A:261:PRO:HA	2.15	0.45
3:A:244:LYS:H	3:A:244:LYS:HG2	1.60	0.45
3:A:259:LEU:HD12	3:A:260:ILE:N	2.31	0.45
3:A:294:ASN:O	3:A:296:TYR:N	2.49	0.45
1:T:5:DA:H2	2:P:3:DT:O2	1.99	0.45
3:A:320:PHE:CE1	3:A:328:ARG:HG3	2.51	0.45
3:A:75:GLU:O	3:A:79:THR:HG23	2.17	0.45
3:A:280:LYS:O	3:A:283:ARG:HB2	2.17	0.45
3:A:228:LEU:HB2	3:A:236:MET:O	2.16	0.45
3:A:129:GLU:HG2	3:A:137:ARG:HD3	1.99	0.45
3:A:165:GLU:HA	3:A:168:LYS:HG2	1.98	0.45
3:A:194:LEU:HD12	3:A:194:LEU:HA	1.40	0.45
3:A:195:LEU:HA	3:A:195:LEU:HD12	1.72	0.45
3:A:18:MET:HE1	3:A:76:PHE:CB	2.47	0.44
3:A:204:SER:O	3:A:206:LYS:N	2.51	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:255:ILE:HG12	3:A:256:ASP:N	2.31	0.44
2:P:2:DC:H2'	2:P:2:DC:O5'	2.18	0.44
3:A:59:ALA:C	3:A:65:VAL:HG21	2.38	0.44
3:A:294:ASN:ND2	6:A:593:HOH:O	2.50	0.44
3:A:209:LYS:HA	3:A:209:LYS:HD3	1.32	0.44
3:A:41:LYS:O	3:A:45:VAL:HG13	2.18	0.44
3:A:243:SER:OG	3:A:249:GLU:HG3	2.18	0.44
2:P:1:DT:H72	6:P:571:HOH:O	2.18	0.44
3:A:41:LYS:HE2	3:A:64:GLY:HA2	1.99	0.44
3:A:306:VAL:HG22	6:A:650:HOH:O	2.17	0.44
3:A:15:ILE:CG2	3:A:46:ILE:CD1	2.96	0.44
3:A:49:TYR:HA	3:A:50:PRO:HD3	1.31	0.44
3:A:180:SER:HA	3:A:183:ARG:HE	1.82	0.44
3:A:253:ARG:HH11	3:A:253:ARG:HG3	1.82	0.43
3:A:232:GLU:O	3:A:233:THR:HG23	2.18	0.43
3:A:27:LYS:HG3	3:A:28:ASN:N	2.33	0.43
3:A:241:LEU:HA	3:A:242:PRO:HD2	1.69	0.43
3:A:266:TYR:HB2	3:A:313:VAL:HG11	2.00	0.43
3:A:280:LYS:O	3:A:284:ALA:N	2.43	0.43
3:A:293:ILE:HA	6:A:593:HOH:O	2.17	0.43
3:A:250:TYR:HB3	6:A:577:HOH:O	2.18	0.43
3:A:309:GLU:O	3:A:311:LEU:HD13	2.18	0.43
3:A:287:LEU:HA	3:A:287:LEU:HD13	1.64	0.43
3:A:309:GLU:N	3:A:310:PRO:HD3	2.33	0.43
3:A:31:GLN:HE21	3:A:112:ARG:CZ	2.31	0.43
3:A:267:CYS:O	3:A:271:TYR:HB2	2.19	0.43
3:A:128:ASN:HB3	3:A:131:LYS:HG3	2.00	0.43
3:A:128:ASN:ND2	3:A:128:ASN:N	2.67	0.42
3:A:183:ARG:HE	3:A:183:ARG:HB2	1.67	0.42
3:A:26:GLU:O	3:A:30:SER:O	2.36	0.42
3:A:182:ARG:NH1	3:A:273:THR:HG21	2.34	0.42
3:A:209:LYS:HA	3:A:212:HIS:HB2	2.01	0.42
3:A:253:ARG:CG	3:A:253:ARG:NH1	2.80	0.42
3:A:18:MET:CE	3:A:76:PHE:HB2	2.49	0.42
3:A:172:GLU:HG3	3:A:198:PRO:HG2	2.01	0.42
3:A:182:ARG:HB3	3:A:273:THR:HG23	2.01	0.42
3:A:31:GLN:NE2	3:A:112:ARG:NH1	2.52	0.42
3:A:122:LEU:HD22	3:A:126:ARG:NH2	2.35	0.42
3:A:36:TYR:CD1	3:A:36:TYR:C	2.90	0.42
3:A:99:PHE:CD1	3:A:99:PHE:C	2.92	0.42
3:A:172:GLU:HB3	3:A:197:HIS:CD2	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:56:GLY:O	3:A:59:ALA:HB3	2.20	0.42
3:A:121:THR:HG23	3:A:124:ASP:CG	2.40	0.42
3:A:156:LEU:HD23	3:A:156:LEU:HA	1.79	0.42
3:A:243:SER:O	3:A:244:LYS:O	2.37	0.42
3:A:288:GLU:C	3:A:290:GLY:H	2.23	0.42
1:T:2:DA:H2"	1:T:3:DT:OP2	2.20	0.41
3:A:15:ILE:HG12	3:A:73:ILE:HG23	2.01	0.41
3:A:132:LEU:HB3	3:A:136:GLN:HB2	2.02	0.41
3:A:260:ILE:HG23	3:A:260:ILE:HD12	1.65	0.41
3:A:157:GLN:HG3	3:A:241:LEU:HD13	2.02	0.41
3:A:68:LYS:O	3:A:71:GLU:HB3	2.20	0.41
3:A:125:LEU:HD23	3:A:125:LEU:HA	1.86	0.41
3:A:15:ILE:CG2	3:A:46:ILE:HD13	2.49	0.41
3:A:302:GLY:HA3	3:A:307:ALA:CB	2.50	0.41
3:A:18:MET:HG2	3:A:22:LEU:HD23	2.02	0.41
3:A:180:SER:HB2	3:A:185:ALA:CB	2.48	0.41
3:A:155:MET:HG2	3:A:158:MET:HE3	2.01	0.41
3:A:260:ILE:CG2	3:A:261:PRO:CD	2.99	0.41
3:A:303:VAL:O	3:A:305:GLY:N	2.54	0.41
1:T:4:DT:H2"	1:T:5:DA:H8	1.86	0.41
3:A:133:ASN:HD22	3:A:135:HIS:H	1.68	0.41
3:A:46:ILE:O	3:A:46:ILE:HG13	2.15	0.41
3:A:49:TYR:CG	3:A:50:PRO:HD2	2.55	0.41
3:A:150:ILE:CD1	3:A:190:ASP:HA	2.51	0.41
3:A:184:GLY:O	3:A:185:ALA:O	2.38	0.41
3:A:331:LYS:HG2	3:A:332:ASP:N	2.32	0.40
3:A:54:LYS:HA	3:A:54:LYS:HD2	1.67	0.40
3:A:89:ARG:C	3:A:89:ARG:HD3	2.41	0.40
3:A:224:ILE:HG22	3:A:225:THR:N	2.31	0.40
3:A:253:ARG:HH11	3:A:253:ARG:HG2	1.86	0.40
3:A:309:GLU:HA	3:A:310:PRO:HD2	1.89	0.40
3:A:200:PHE:O	3:A:262:LYS:N	2.49	0.40
3:A:259:LEU:HD12	3:A:259:LEU:HA	1.70	0.40
3:A:260:ILE:HG22	3:A:261:PRO:CD	2.51	0.40
3:A:37:ASN:HD22	3:A:37:ASN:HA	1.70	0.40
3:A:62:LEU:HA	3:A:62:LEU:HD12	1.77	0.40
3:A:304:THR:H	3:A:304:THR:HG23	1.28	0.40
3:A:22:LEU:HA	3:A:22:LEU:HD13	1.47	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	A	325/335 (97%)	272 (84%)	37 (11%)	16 (5%)	<b>2</b> <b>8</b>

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	185	ALA
3	A	205	THR
3	A	244	LYS
3	A	246	ASP
3	A	247	GLU
3	A	295	GLU
3	A	309	GLU
3	A	80	GLY
3	A	204	SER
3	A	304	THR
3	A	206	LYS
3	A	10	THR
3	A	310	PRO
3	A	207	GLN
3	A	289	LYS
3	A	13	GLY

### 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.

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
3	A	288/295 (98%)	226 (78%)	62 (22%)	<b>1</b> <b>3</b>

All (62) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	A	10	THR
3	A	11	LEU
3	A	18	MET
3	A	19	LEU
3	A	22	LEU
3	A	27	LYS
3	A	30	SER
3	A	36	TYR
3	A	37	ASN
3	A	41	LYS
3	A	45	VAL
3	A	46	ILE
3	A	52	LYS
3	A	54	LYS
3	A	61	LYS
3	A	62	LEU
3	A	65	VAL
3	A	67	THR
3	A	77	LEU
3	A	79	THR
3	A	81	LYS
3	A	89	ARG
3	A	94	SER
3	A	95	SER
3	A	100	LEU
3	A	104	SER
3	A	119	ILE
3	A	121	THR
3	A	128	ASN
3	A	133	ASN
3	A	153	GLU
3	A	168	LYS
3	A	191	MET
3	A	194	LEU
3	A	201	THR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	A	214	VAL
3	A	218	LEU
3	A	226	ASP
3	A	228	LEU
3	A	245	ASN
3	A	248	LYS
3	A	251	PRO
3	A	253	ARG
3	A	255	ILE
3	A	256	ASP
3	A	263	ASP
3	A	270	LEU
3	A	277	ILE
3	A	279	ASN
3	A	287	LEU
3	A	293	ILE
3	A	294	ASN
3	A	295	GLU
3	A	301	LEU
3	A	304	THR
3	A	309	GLU
3	A	311	LEU
3	A	314	ASP
3	A	325	TRP
3	A	327	TYR
3	A	331	LYS
3	A	335	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	A	12	ASN
3	A	28	ASN
3	A	31	GLN
3	A	37	ASN
3	A	128	ASN
3	A	133	ASN
3	A	136	GLN
3	A	157	GLN
3	A	212	HIS
3	A	213	GLN
3	A	217	GLN

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Mol	Chain	Res	Type
3	A	245	ASN
3	A	252	HIS
3	A	279	ASN
3	A	294	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](#)

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 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 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	$\# Z  > 2$
4	SO4	A	338	-	4,4,4	0.80	0	6,6,6	0.92	0

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	338	SO4	1	0

## 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](#)

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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	T	8/8 (100%)	0.14	1 (12%) 3 3	21, 43, 92, 98	1 (12%)
2	P	7/7 (100%)	-0.74	1 (14%) 2 2	21, 24, 36, 99	0
3	A	325/335 (97%)	-1.01	1 (0%) 94 94	6, 33, 85, 100	0
All	All	340/350 (97%)	-0.98	3 (0%) 84 84	6, 33, 86, 100	1 (0%)

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	T	1	DC	5.5
3	A	246	ASP	3.1
2	P	7	DG	2.6

### 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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
4	SO4	A	338	5/5	0.74	0.38	70,70,70,70	5

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	NA	A	342	1/1	0.80	0.29	69,69,69,69	0
5	NA	A	341	1/1	0.98	0.07	22,22,22,22	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.